

Dental Digest

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About Our CONTRIBUTORS

BALINT J. ORBAN, M.D. (University of Budapest, 1922), M.D. (University of Vienna, 1930), D.D.S. (Northwestern University, Dental School, 1938) is the author of a book, ORAL HISTOLOGY AND EMBRYOLOGY, has contributed chapters to several other books, and has published innumerable articles on the subjects of histopathology of the supporting tissues of teeth, and periodontics. Doctor Orban presents in the current issue the first installment of a three-part article, BIOLOGIC PRINCIPLES IN PERIODONTICS.

JOSEPH C. RISSE, M.D. (Iowa State University Medical School, 1923) is an orthopedic surgeon who has published several articles on scoliosis and its treatment. Doctor Risser makes his first appearance in DIGEST this month with RELAXING EXERCISES FOR THE DENTIST, an illustrated series of corrective exercises directed specifically to the needs of the dentist.

MEYER M. SILVERMAN, D.D.S. (Georgetown University, School of Dentistry, 1934) is a general practitioner who has contributed a number of articles to the dental literature. Doctor Silverman has made a thorough study of the techniques for measurement of vertical dimension and presents in this issue the first of a two-part article, ACCURATE MEASUREMENT OF VERTICAL DIMENSION BY PHONETICS AND THE SPEAKING CENTRIC SPACE.

ROBERT G. MILLER, D.D.S. (Baltimore College of Dental Surgery, Dental School, University of Maryland, 1937) is an Associate Professor in Dental Anatomy at the University of Maryland Dental School and an Instructor in Radiography. Doctor Miller, who will be remembered for his previous article, X-RAYS CANNOT BE OVERDEVELOPED, published in August, 1950 presents in this issue. GROSS RADIOGRAPHIC SURVEY ON THREE NEGATIVES.

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BIOLOGIC PRINCIPLES

*in Periodontics: Part One**

BALINT J. ORBAN, M.D., D.D.S., Colorado Springs

DIGEST

In this first section of a three-part treatment of the principles underlying periodontia a description is given of the physiology of the normal gingiva, the process of tooth eruption, and a definition of the terms employed in clinical analysis of the subject.

The Normal Gingiva

The gingiva can be divided into the "free gingiva" and "attached gingiva." The dividing line between these two parts of the gingiva is the "free gingival groove" which runs parallel to the margin of the gingiva at a distance of 0.5 to 1.5 millimeters (Fig. 1).

Free Gingiva—On histologic section the free gingival groove is a shallow V-shaped groove corresponding to a heavy epithelial ridge which divides the "free" from the "attached" gingiva (Fig. 2). The free gingival groove develops at the level of or somewhat apically to the bottom of the gingival sulcus. In some cases the free gingival groove is not as well defined as in others, and then the division between the free and attached gingiva is not clear.

The free gingival groove and the epithelial ridge are brought about by functional impacts upon the free gingiva folding the movable free part back upon the attached and immovable zone.

Attached Gingiva—The attached gingiva is characterized by high con-

nective tissues, ridges elevating the epithelium, the surface of which appears stippled (Fig. 3). The stippling is probably an expression of functional adaptation to mechanical impacts. The degree of stippling varies with different people. The disappearance of stippling is an expression of an involvement of the attached gingiva in a progressing gingivitis.

Effects of Structural Differences—The scalloped line separating gingiva and alveolar mucosa is caused by the difference in their structure:

1. The attached gingiva is stippled, firm, thick, and lacks a separate submucous layer, is immovably attached to the bone, and has no glands. The gingival epithelium is thick and hornified; the epithelial ridges and the papillae of the lamina propria are high (Fig. 2).

2. The alveolar mucosa is thin and loosely attached to the periosteum by a well-defined submucous layer of loose connective tissue; it may con-

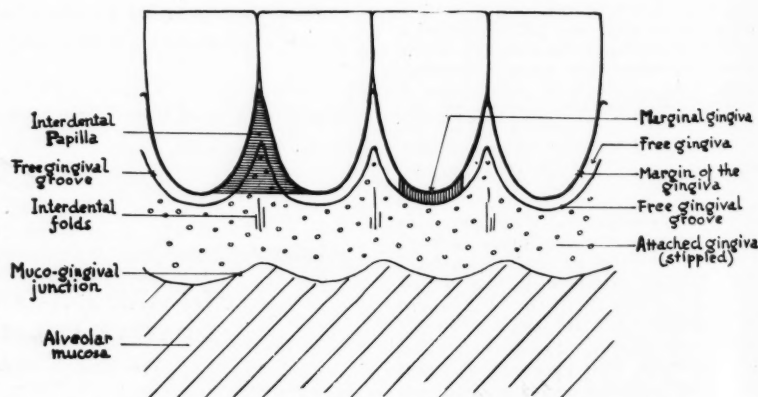
tain small mucous glands. The epithelium is thin, not hornified, and the epithelial ridges and papillae are low and are often entirely missing (Fig. 2).

The structural differences also cause the color difference between the pale pink gingiva and the dark red lining mucosa.

The Interdental Papilla—That part of the gingiva that fills the space between two adjoining teeth and is limited at its base by a line drawn from the margin of the gingiva of the center of one tooth to the center of the other is the interdental papilla (Fig. 1).

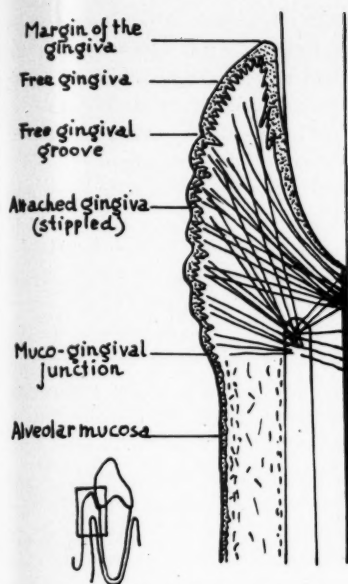
The interdental papilla is composed of free gingiva and attached gingiva in various relations, depending largely upon the topographic arrangement of the neighboring teeth.

Differentiation—The differentiation between the interdental papilla and marginal gingiva is based on clinical considerations. The marginal gingiva is that part of the free gingiva which is localized to the labial, buccal, and lingual aspects of the teeth.



1. Diagrammatic illustration of surface characteristics of the gingiva.

*The material in this article was presented at the second Mid-Atlantic States Seminar in Oral Medicine, at Skytop, Pennsylvania, November 5-10, 1950.



2. Diagrammatic illustration of labio-lingual section of gingiva, alveolar mucosa, alveolar bone, and tooth.

Definitions of Terms

1. *Gingiva*—That part of the oral mucous membrane surrounding the teeth and adapted to resist masticatory stresses.

2. *Alveolar Mucosa*—The covering of the alveolar process extending to the fornix of the oral vestibulum and on the lower jaw to the sublingual sulcus, loosely attached to the bone (replaced on lingual surface of the upper jaw by palatine mucosa).

3. *Mucogingival Junction* — The scalloped line separating the gingiva from the alveolar mucosa (Fig. 1).

4. *Attached Gingiva*—That part of the gingiva that is firmly attached to the underlying tooth and bone and stippled on the surface.

5. *Interdental Grooves* — Vertical grooves in the interdental area of the attached gingiva (Fig. 1).

6. *Free Gingiva*—That part of the gingiva that surrounds the tooth and is not directly attached to the tooth surface; the outer wall of the gingival sulcus.

7. *Free Gingival Groove*—Shallow line or depression on the surface of the gingiva between the free and attached gingiva.

8. *Interdental Papilla*—That part of the gingiva that fills the interproximal space between two adjacent teeth, consisting partly of attached and partly of free gingiva.

9. *Margin of the Gingiva*—The coronal border of the free gingiva.

10. *Marginal Gingiva*—That part of the free gingiva that is localized at the labial, buccal, and lingual aspects of the teeth.

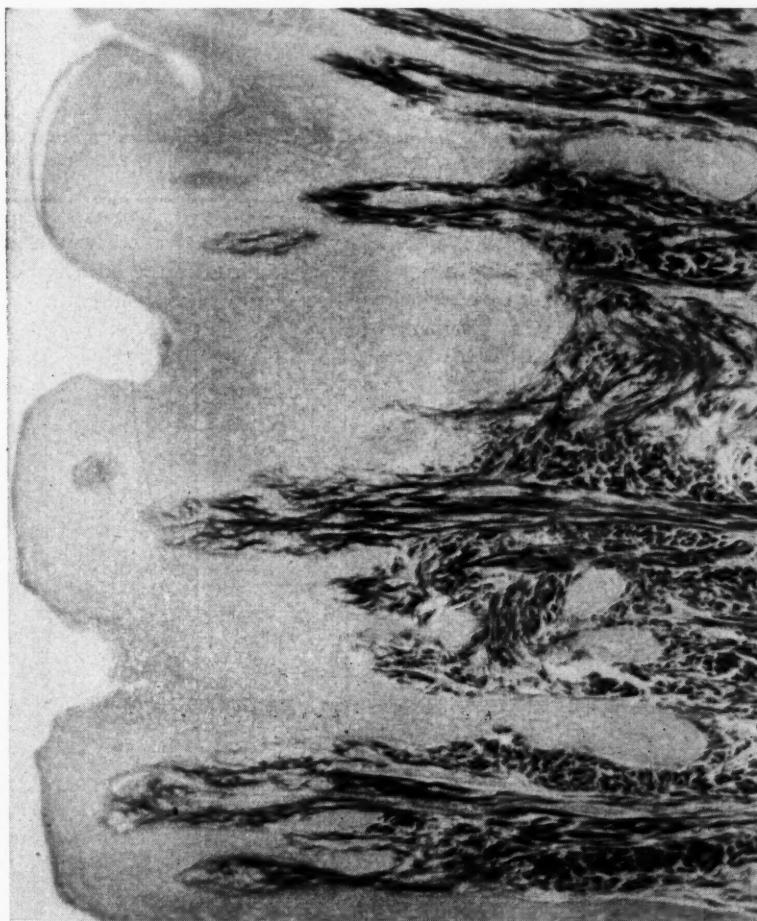
The Epithelial Attachment, Gingival Sulcus, and Gingival Pocket

The enamel is the product of the epithelial cells of the tooth germ. After the enamel is completely developed (the last layer formed being the primary enamel cuticle) the epithelial cells remain in organic connection with the enamel.

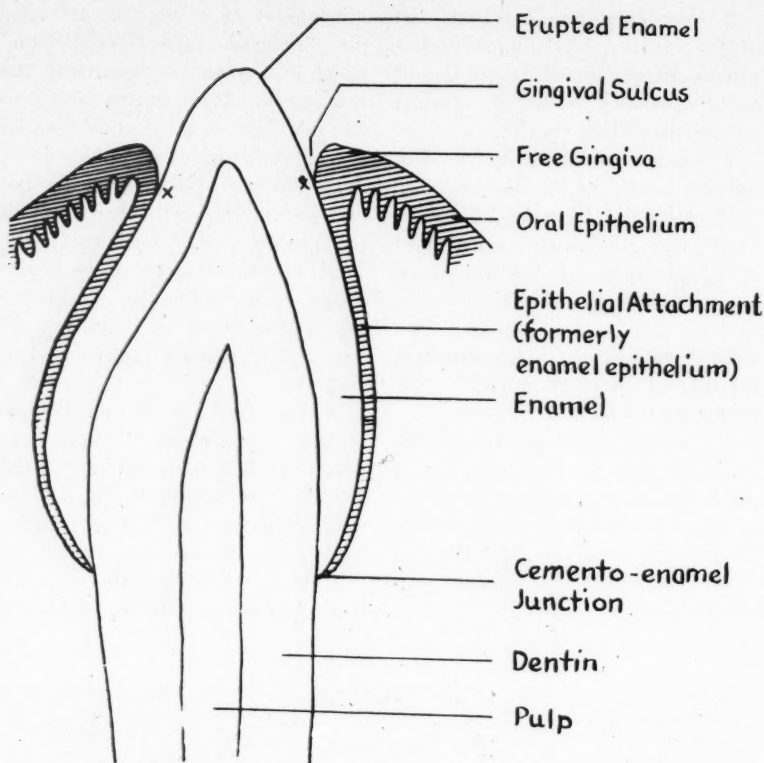
Eruption of a tooth occurs after the "reduced enamel epithelium" which covers and is fused with the enamel, has fused to the oral epithelium. The center of this area of fusion degenerates and the tip of the crown or cusp appears in the oral cavity. During further eruption two processes are coordinated: (1) True vertical movement of the tooth; *active eruption*, and (2) progressive exposure of the tooth by peeling off the gingiva from the crown; *passive eruption*.

Process—1. In peeling off the epithelium produces the secondary or dental cuticle, a hornified layer about 1/1000-1/100 millimeter thick. It remains fused to the enamel surface while the epithelial cells peel off.

2. In this way the eruption of a tooth is effected without piercing a



3. Normal attached gingiva, stippled. Silver impregnation: shows arrangement of connective tissue fibers.



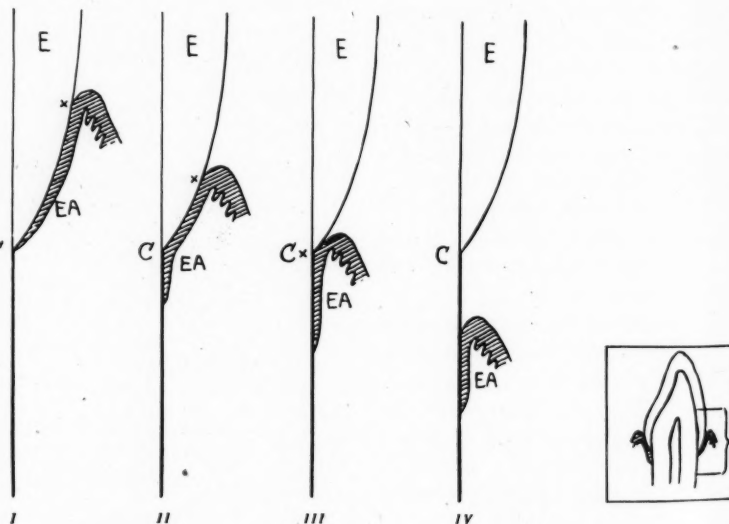
4. Diagram illustrating "epithelial attachment" immediately following eruption of enamel into the oral cavity.

hole into the epithelium; that is, the continuity of the oral epithelium is safeguarded. This is not contradicted by the observation that there is a point of lessened resistance where soft and hard tissue meet.

3. After partial eruption of the crown, the epithelium which is not just in contact with, but is fused to, the enamel, is termed "epithelial attachment" (Fig. 4). It is a cuff-like band extending from the depth of the gingival sulcus to the cemento-enamel junction. The gingival sulcus is normally shallow. The ideal depth would be zero. It changes into a gingival pocket if pathologic changes in the gingiva develop.

Progressive Changes—1. With progressing age more and more of the enamel-covered crown is denuded by passive eruption, and at the same time the width of the epithelial attachment (depth of the gingival sulcus to the cemento-enamel junction) is reduced. Nature seems to seek to

keep the epithelial attachment at a certain width to secure an adequate protecting area of attachment.

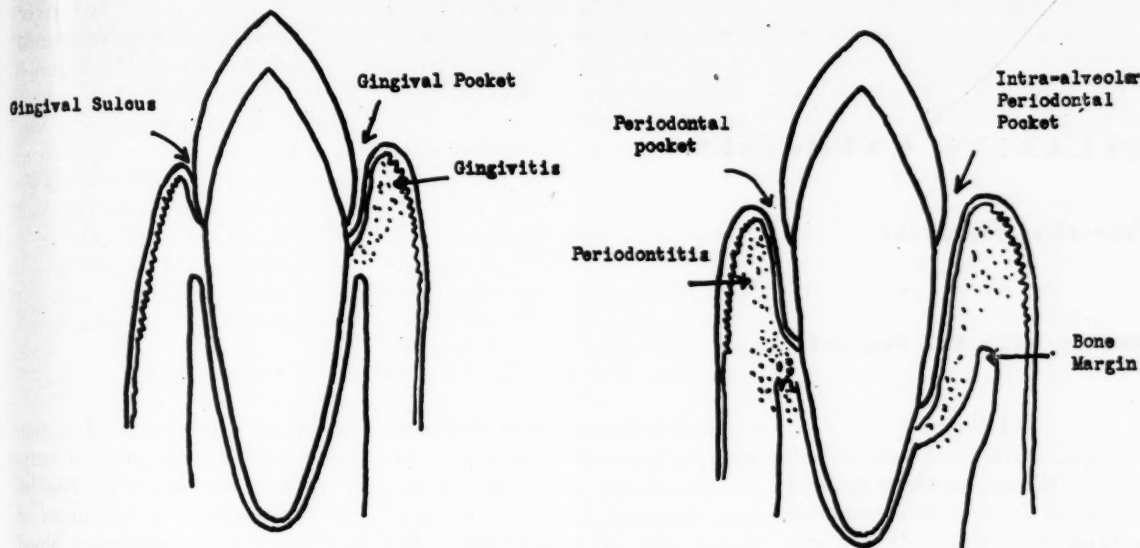


5. Diagram illustrating four stages of passive eruption of teeth; the position of the bottom of the gingival sulcus and epithelial attachment with advancing age. Passive eruption is a physiologic process if it occurs at a certain slow rate.

2. To counteract the loss of width of the epithelial attachment at the gingival end, the epithelium at the cemento-enamel junction starts to proliferate into the depth along the surface of the cementum. It gains a firm attachment to the cementum (Fig. 5).

Process Not Fully Understood—The mode of the acquired attachment of the epithelium to the cementum is not fully understood. The epithelium cannot grow into the depth as long as fibers of the periodontal membrane are attached to the cementum apically at the deepest point of the epithelial attachment. Whether the fibers degenerate first and the cementum then loses its vitality, or whether the loss of vitality of the cementum is primary and the degeneration of the fibers secondary, is a controversial question. There is even a third possibility which is lately being discussed; namely, that the epithelial cells actively destroy the connective tissue fibers which block their proliferation. (Desmolysis).

Purpose of the Proliferation—Whatever may be the explanation of the mode of the process of proliferation it is clear that the proliferation of the epithelium along the cementum accomplishes the maintenance of a cuff-like epithelial attachment when



6. Diagram illustrating the differences between gingival sulcus, gingival pocket, periodontal pocket, and intra-alveolar pocket.

the crown is about to be entirely exposed, and after this time. This protection at the weak point of the gingival attachment to the tooth has to be paid for by the loss of some of the attaching fibers of the periodontal membrane.

Passive Eruption a Continual Process—Eruption of the crown is followed immediately and without pause by eruption of the root. Furthermore, passive eruption is not progressing at the same speed at all surfaces of the tooth. For instance, at the labial surface of an incisor the root may already be exposed while on the interproximal surfaces the enamel is not entirely exposed.

Four Stages in Eruption—Passive eruption may be described as proceeding in four stages (Fig. 5):

1. Enamel-covered crown only partly erupted; epithelial attachment entirely on enamel, deepest point at cemento-enamel junction.

2. Enamel-covered crown only partly erupted; epithelial attachment proliferating along cementum partly on enamel, partly on cementum.

3. Enamel-covered crown entirely erupted; epithelial attachment on cementum only, most superficial point (gingival sulcus) at cemento-enamel junction.

4. Part of the cementum-covered root erupted; epithelial attachment entirely on cementum.

Definition of Terms—Because of the continual eruption of crown and root and because of the clinical applicability, two pairs of terms should be mentioned:

1. **Anatomic crown** is the enamel-covered part of the tooth

Clinical crown is the exposed part of the tooth

2. **Anatomic root** is the cementum-covered part of the tooth

Clinical root is the attached part of the tooth

(1) The border between anatomic

crown and root is the cemento-enamel junction;

(2) the border between clinical crown and root is the depth of the gingival sulcus.

Comparison of Stages—(1) In stage 1 and 2 of continual eruption the clinical crown is shorter than the anatomic crown. (2) In stage 3, the clinical crown is identical to the anatomic crown. (3) In stage 4, the clinical crown is longer than the anatomic crown. (4) The reverse is true for clinical and anatomic root. The importance of these relations for the leverage and firmness of the tooth is self-evident.

Formation of Pocket—The gingival pocket changes into a *periodontal pocket* if, after destruction of a part of the alveolar crest, the bottom of the pocket encroaches upon the former periodontal membrane. If the bottom of the periodontal pocket lies beyond the alveolar crest, we speak of an *intra-alveolar pocket* (Fig. 6).

(To be continued next month)

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Acknowledgments

Figures 1, 2, and 3 are reproduced from the paper, *Clinical and Histologic Study of the Surface Characteristics of the Gingiva*, by Balint J. Orban, in *Oral Surg., Oral Med., and Oral Path.* 1:827 (Sept.) 1948.

Figure 4 is Figure 177 from *Oral Histology and Embryology*, by Balint J. Orban, ed. 2, St. Louis, C. V. Mosby Company, 1949.

Figure 5 is Figure 188 from *Oral Histology and Embryology*, by Balint

J. Orban, ed. 2, St. Louis, C. V. Mosby Company, 1949.

Figure 6 is from *Nomenclature in Periodontia*, (Report of the Committee of the American Academy of Periodontology, 1947) in *J. Periodontology* 18:174 (Oct.) 1947.

RELAXING EXERCISES

for the Dentist

JOSEPH C. RISSE, M.D., Pasadena

DIGEST

Physical activity is a valuable adjunct in the maintenance of good health. It is an easily available method for improving the circulation of blood through the body, thereby aiding the heart in its action. However, many conveniences, such as the automobile and household improvements, have destroyed much of the incentive and opportunity for physical effort.

Therefore, if the dentist is to preserve bodily health, and particularly healthy joints, it is imperative that he indulge in some type of regular physical activity. It is as important that the dentist maintain bodily fitness for engaging in his profession as it is for the prize-fighter or the football player to condition his body for the physical exactions of his occupation.

A series of recumbent postural exercises especially adapted to the needs of the dentist are illustrated and described in detail in this article.

The Occupational Hazard in Dentistry

Dentists work under an occupational hazard of relatively little physical activity:

1. They are required to stand for long hours bending over patients in difficult postural attitudes.
2. The occupation of dentistry invites little physical activity but is conducted under a certain amount of nervous tension because of the delicacy and accuracy required.

3. Day-to-day stress in abnormal postures frequently induces pain in the lower back, at the base of the neck, shoulders, and also in the feet. Occasionally, in chronic cases, the pain from the spine may be referred to the legs or to the arms.

Inherited Contractures

The human body is handicapped by joint contractures which limit the motion in the joints. These contractures may be inherited. Typical examples of inherited contractures are (1) those of the heel cord, inherited from our quadrupedal ancestors who walked around with feet in equinus resulting in shortening of the heel cord, and (2) the hip flexor contractures, a result of the quadrupedal ancestry (all four position).

Acquired Contractures

Besides the inherited contractures, maintaining the same position for long periods during the day may result in acquired contractures: 1. The workman who grasps the handle of a shovel all day will eventually develop flexion contractures in his hand. 2. The dentist, maintaining in his occupation one position of bending over a patient for long periods of time will similarly limit the range of motion in the joints of the spine and the extremities.

Muscular Activity an Aid to Health

Contraction and relaxation of muscles will improve the blood supply and thereby lessen fatigue. When the joints controlled by the muscles are

engaged in a full range of motion fatigue products from physical activity will be forced out of the muscles and with relaxation a new supply of fresh, nourishing, oxygenated blood will return to the muscles. This procedure will lessen fatigue.

Health of the Joints—The articular cartilage of the joints is nourished, not by a direct blood supply, but indirectly by a process called imbibition or sucking. When pressure is put upon the articular cartilage by a complete range of motion in one direction and then in the opposite direction, the process of imbibition or sucking the nourishment into the cartilage is accomplished.

Arthritic Conditions May be Relieved—In order to have healthy cartilages, physical activity, employing a full range of motion of the joints, is required. In this way arthritis is prevented and frequently pain from arthritic degenerative changes is relieved.

The Object of Exercise—By stretching out the contractures, either congenital or acquired, the posture of the person is improved. Gravity plays a large part in fatigue and body posture; it is therefore important to take any series of relaxing exercises lying down.

Exercises Suggested

The postural recumbent exercises illustrated have been used for a number of years with gratifying results, particularly in those persons who complain of (1) pain in the lumbosacral spine or lower back, (2) pain at the base of the neck and into the shoulders, and (3) pain in the feet.

Postural Recumbent Exercises

Objectives: To stretch out joint contractures and educate muscles to pull down with gravity when in a standing position.

With stretching there is the beginning of relaxation and a desire to let go and rest. Stretching must be done slowly. In fact one should get from these exercises the same feeling of enjoyment as in the early morning stretch.

Stretching muscles implies increas-

ing the joint range of motion. It also implies a complete contraction of the opponent muscles followed by its complete relaxation. A muscle with its fluid content (essentially blood) can be likened to a fluid-filled rubber bulb which, when completely compressed, is emptied of its fluid. With release of the compression the bulb is filled again. This filling process requires time and in contraction of a muscle (emptying process) followed by relaxation (filling process) the element of time must be considered,

and so in doing these exercises, the sequence of contraction, relaxation, rest should be observed. The latter is the time required for filling process. Stretching then is the theme of these exercises.

In order to gain the greatest benefit from the exercises, they should be done two or three times daily. A firm surface is important. Do the exercises on a padded floor in a spot which is protected from drafts, on a plywood board which may be placed on a bed, or on a posture bench.

Exercises For Low Back Pain.



KNEES TO CHEST

Objective: To stretch out the low back

Lie on back with hands clasped over knees. Draw knees down to chest. Return to arm's length.

10-20 times

HALF OVER KNEES TO CHEST

Objective: To stretch the muscles on one side of the low back

Lie on back with hands clasped over knees. Carry knees half way to the right side and draw to chest. Relax to midline. Alternate to left side.

5-10 times to each side



SIDE ROLL STRETCH

Objective: To stretch the hips sideways from the trunk

Lie on back with hands clasped over knees. Roll and stretch both knees to the right, right elbow bent and carried away from body. Lead with right knee, flexing and pushing left knee to make knees level.

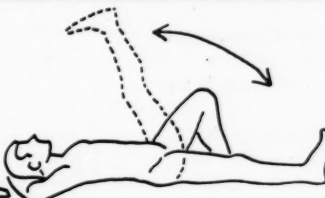
5-10 times to each side

SIDE TIP OF THE PELVIS

Objective: To stretch lateral trunk muscles by pushing pelvis down

Lie on back with hands clasped over knees. Draw knees to chest and to right side, left side of pelvis coming up to ribs. Alternate to opposite side.

5-10 times to each side



PELVIC ROTATION

Objective: To flatten the low back

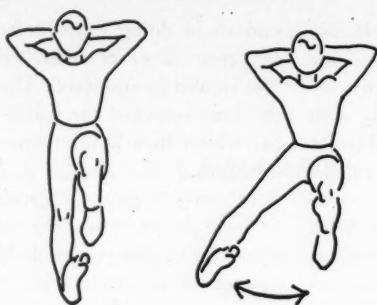
Lie on back with knees bent and heels on floor close to buttocks. Hands under head and elbows relaxed on floor. Rotate pelvis by contracting buttocks and raising them slightly from floor. At the same time flatten the low back to floor. The abdominal muscles should be relaxed and do not initiate this movement.

STRAIGHT LEG ABDUCTION

Objective: To increase side motion of the hip

Lie on back with left knee bent, right leg straight. Hands under head and elbows relaxed on floor. Turn toes of right foot in. Swing right leg, heel leading, sharply to right side keeping it close to floor. Return immediately to starting position and rest. Repeat for left leg.

5 times each leg

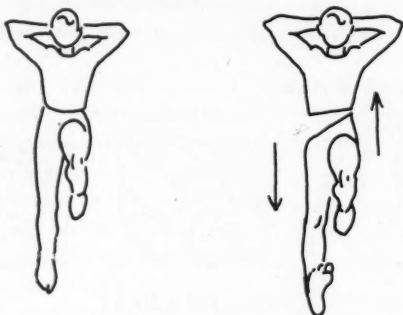


STRAIGHT LEG STRETCH

Objective: To stretch lateral trunk muscles by pushing pelvis down and making leg longer

Lie on back with left knee bent, right leg straight, hands under head and elbows resting on floor. Stretch right leg to make it longer, heel leading. Reverse position and repeat for left leg.

5-10 times each leg



STRAIGHT LEG SWING

Objective: To stretch posterior muscles (hamstrings)

1. Lie on back with left knee bent. Draw right knee to chest with hands. Circle foot clockwise slowly and completely.

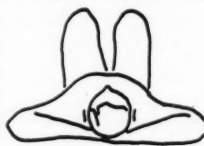
10 times

2. With foot dorsiflexed, release grasp of hands and kick leg straight, heel leading.

3. Keeping foot dorsiflexed, kick straight leg vigorously upward. Relax between kicks.

10 times

Repeat all steps for left leg. In circling left foot, motion is counterclockwise.



FORWARD ROLL

Objective: A rolling massage of the low back

Lie on back with hands clasped over knees. Bring knees as far as possible to chest, so that buttocks are elevated from floor and a rocker is made of the lower back. Rock forward and backward, first on one side of the spine and then on the other.

5-10 times

KNEE SIDE ROLL

Objective: To stretch hip flexors

Lie on back with knees bent, hands behind head, elbows relaxed on floor. Stretch flexed knees to side as far as possible. To make more effective place right foot on left knee and stretch to right side, stretching left hip flexors. Repeat on alternate side.

3-5 times each side

Exercises For The Upper Back



ARM STRETCH

Objective: To stretch trunk muscles

Lie on back with knees bent, right arm well above head and left arm along body. Stretch right arm upward and left arm downward. Reverse position and repeat.

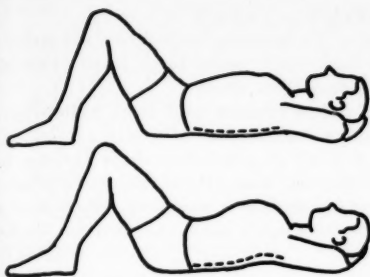
3-5 times in each position

TRUNK TORSION

Objective: To give torsion stretch of the trunk

Lie on back with knees bent and straight arms at sides. Stretch right arm in a wide circle overhead keeping arm on floor. Carry straight arm over face to the left to meet the left arm. Reach with both hands downward to left heel. Reverse by continuing with both hands together in the opposite direction.

5 times each side



BRIDGE

Objective: To straighten thoracic spine

Lie on back with knees bent, both hands under back of head, elbows relaxed on floor. Raise upper back from floor forming a bridge between head and lower back. Eventually this should be done keeping low back on floor.

5-10 times



PAD LYING

Objective: Passive flattening of the upper back

Make a pad of newspapers 15 inches long, 4 inches wide and 1 inch thick. Place the pad under and across the shoulders at the point of greatest rounding of the upper back. Lie on back with knees bent, hands under head and elbows relaxed on floor.

10-15 minutes

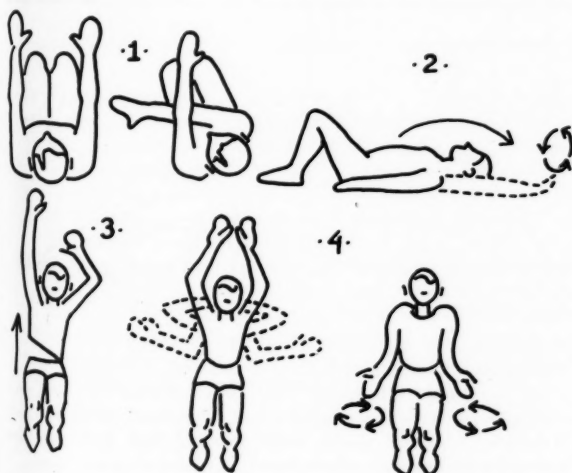


NECK STRETCH

Objective: To stretch the posterior muscles of the neck

Lie on back with knees bent. With little fingers and elbows together and palms facing you, place hands on back of head. Raise chin to chest. Slowly stretch back of neck to flatten on the floor. The effect on either side is increased by turning the face to left or right.

5-10 times each way



ARM EXERCISE

Objective: To stretch muscles of arms and shoulders
Initial position: Lie on back with knees bent and arms stretched and straight at sides.

1. Cross Arm Side Roll

Carry straight arms upward stretching toward the ceiling. Cross straight stretched arms and roll to side touching fingers to floor. Repeat to alternate sides.

3-5 times each side

2. Wrist Circles

Carry straight stretched arms overhead, letting them drop. Circle wrists in each direction

3-5 times

3. One Arm Longer

Make one arm longer by stretching one overhead and by contracting opposite trunk muscles. Alternate arms.

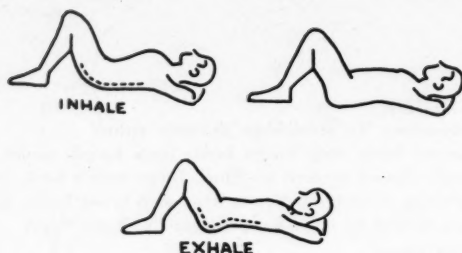
3-5 times each arm

4. Praying Mantis Position

With palms facing toward ceiling and finger tips together, carry arms down beneath head, elbows flexed and on floor. Continue the downward movement of flexed elbows on floor, palms toward ceiling as in the position of the Praying Mantis. Complete the downward movement by carrying the straight stretched arms to the side. Rotate shoulders and straight stretched arms inward and outward.

3-5 times

3 times entire exercise



BREATHING TRIAD

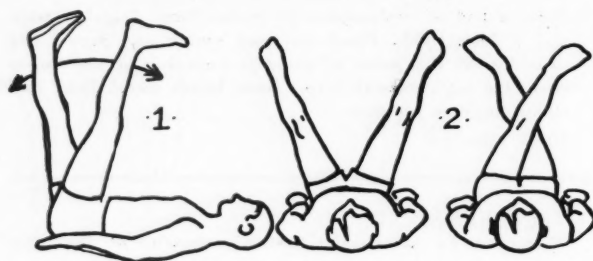
Objective: To increase respiratory excursion

Lie on back with knees bent, hands behind head, elbows relaxed on floor.

1. Do a pelvic rotation and hold. Follow by a deep complete inhalation.
2. When limit is reached, exhale forcing back of neck flat on floor. Relax pelvic rotation.
3. When exhalation is complete, relax neck and do not breathe again until you have to. Do not hold breath.

5-10 minutes

More Advanced Exercises For The Spine



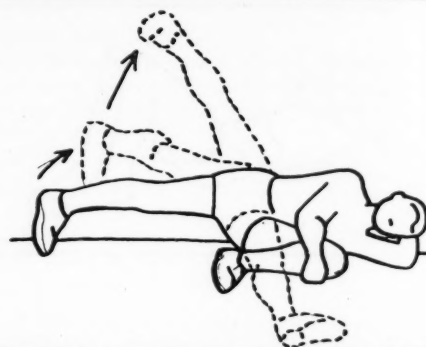
SCISSORS

Objective: To strengthen abdominal muscles and stretch posterior leg muscles (hamstrings)

Lie on back with knees bent. Draw knees to chest and straighten legs to right angle.

1. Scissors motion of straight legs forward and backward.
2. Scissors motion of straight legs to side.

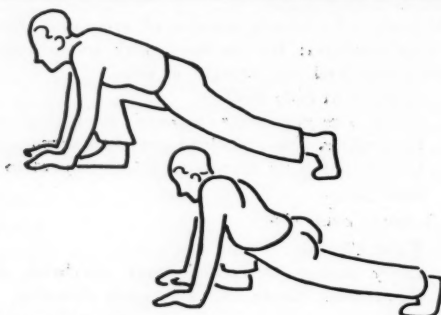
10 times each way



ABDUCTION-EXTENSION FROM SIDE LYING POSITION

Lie on left side with head resting into left flexed elbow, hand back of head. Clasp left flexed knee with right hand. Extend right leg pointing toe toward floor. Carry the straight leg and foot in this position, backward as far as possible. Then raise straight leg upward as far as possible and carry straight leg forward as far as possible. Rest.

5 times



SPRINTER'S EXERCISE

Objective: To stretch hip flexor muscles

Assume modified sprinter's position with posterior leg straight, foot braced against wall. Let body drop to floor on straight leg side.

10 times

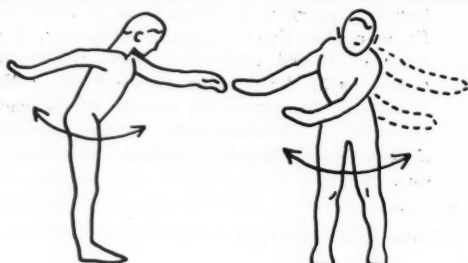


STRAIGHT LEG FORWARD ROLL

Objective: To stretch posterior muscles

Lie on back with knees bent. Draw knees to chest and straighten legs. Grasp ankles (or pant legs). Keeping feet dorsiflexed, rock entire body forward and back so that toes touch the floor above head.

5-10 times



ARM SWING (Standing Position—Two Arm Swing)

Objective: To increase passive shoulder motion

Bend slightly forward from hips:

1. Swing relaxed arms pendulum fashion forward and backward alternately, increasing length of swing as tolerated.
2. Swing relaxed arms together from side to side in front of the body as in a golf stroke.

5-10 minutes

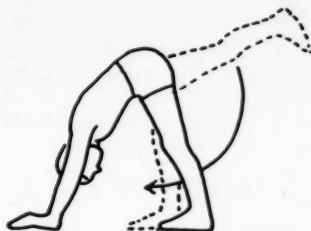


FORWARD BEND DOWN

Objective: To stretch posterior muscles

Stand with feet parallel, weight on outer sides of feet and toes. Drop forward and down. Let the pull of gravity on the trunk increase the stretch. The effectiveness of this can be increased by raising the trunk 4 to 6 inches and dropping again with gravity.

10-20 times



WALK-UP

Objective: To stretch and straighten the posterior structures of the leg.

With legs straight, hands on floor in an all-fours position, kick straight leg upward. Alternate legs, each time advancing the returning foot slightly forward toward hands.

5 times each leg



WALL EXERCISE

Objective: To assume proper standing posture

1. Stand back to wall, heels 6 to 8 inches away. Bend forward to touch toes with knees straight.
2. Bend knees, buttocks and sacrum against wall.
3. & 4. Roll pelvis and spine upward against wall, so that entire back is touching.
5. Slide straight back upward against wall straightening knees. Keep back flat against wall while the feet are alternately and slowly moved toward the wall approximately half the distance.
6. With entire body held straight push the body forward from the wall through motion in the ankle.

5 times

STANDING POSTURE

Objective: To assume a relationship of body segments which is

1. Physiologic
 - a. Chest elevated
 - b. Abdomen retracted
2. Mechanically efficient—the strong posterior muscles pull down with gravity

3. Cosmetically desirable—the front contour has attractive curves and back present strength in straightness.

This is best accomplished by:

1. Standing as straight as possible. This position commonly consists of slight hyperextension of upper spine.



HEEL TOE WALKING

Objective: To simulate the action of a rocker

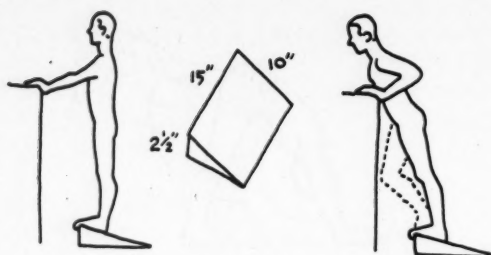
To more easily get the feel of rocking on the feet, place one foot just ahead of the other. Carry the body weight over the forward foot lifting only the heel of rear foot. Let the body weight carry backward to rear foot, lifting only the toe of the forward foot. The heel and toes in opposition should be on the floor at all times. Attention should be paid to placing the body weight on the outer sides of the feet. The resultant motion will be that of rocking forward and to the outer sides of the feet. Reverse feet. It may be necessary at first to use the support of a chair back.

With this forward rocking idea now place one foot forward, heel down and toe up in a straight line. Carry body weight forward over leading foot, weight on outer side of foot and keeping toe of rear foot on floor as long as possible, as the rear knee bends forward. When body weight has been carried forward to place all weight on forward foot, carry rear foot forward (not upward) and place heel on floor and toes up as in the beginning.



2. Keeping entire spine fixed (no motion) bend forward at hips about 10°-15°.
3. Contracting and pulling buttocks downwards. This flattens low back and necessarily retracts the lower abdomen.
4. Keeping trunk slightly forward, drop chin, stretching neck; then force back of neck backward necessarily elevating the chest. Finally elevate and place chin slightly forward.

The result of this correction of relationship of body segments gives the desired posture which allows the posterior muscles to pull down with gravity.

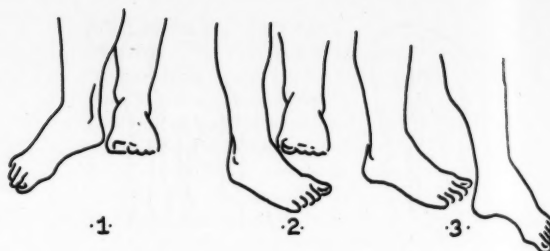


HEEL CORD STRETCH

Objective: To stretch the heel cord

Place angle board facing end of table or chair back. Stand on board with feet parallel, weight on outer sides of feet, toes curled over end of board and hands on support in front. Bend right knee. Keeping left heel down, left knee straight, and trunk erect, rock forward, stretching left calf muscle. This stretch will be felt behind the left knee. Reverse position and repeat.

Note: This exercise may be done without an angle board.



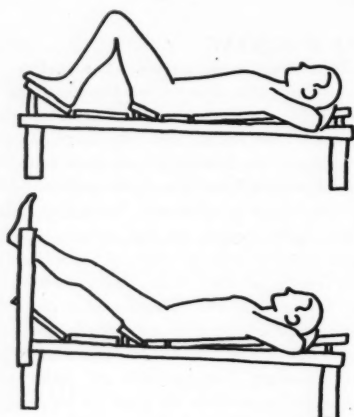
SAND SCRAPE WALK

Objective: To adduct the forefoot and throw weight on the outer side of the foot.

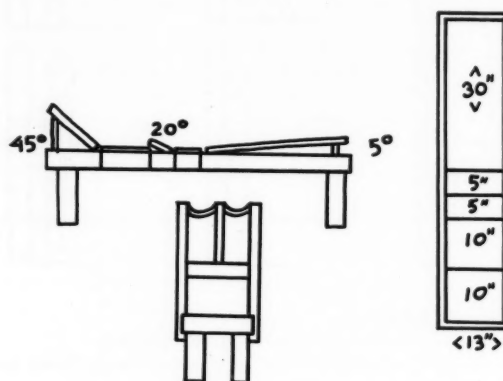
Stand with feet parallel. Place right heel in front of left toes with right foot pointed out 45 degrees. The weight should be on outer side of foot and toes should be flat on floor. Pivot on right heel through a 90 degree arc as if scraping up a pile of sand. Transfer the weight to the forward foot and place the rear foot in same straight oblique line and repeat.

Note: In the beginning it may be necessary to use support in maintaining balance. Use stockings on bare floor and barefeet on rugs.

5 times across a ten foot room



Use of the Posture Bench



Diagrams of the Posture Bench

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Accurate Measurement of Vertical Dimension

by PHONETICS and the SPEAKING CENTRIC Space

Part I

MEYER M. SILVERMAN, D.D.S., Washington, D.C.

DIGEST

Vertical dimension has been defined by Smith¹ as the vertical dimension of the intermaxillary space which is later to be occupied by the dentures when the teeth are in centric occlusion.

In this article is presented a physiologic method for determining the vertical dimension or the natural distance between the upper and lower jaws, which should eliminate the greatest cause of full denture failures. The procedure for measurement described is based on the position of the mandible during speech or the pronunciation of various phonetic sounds which provide the patient's accurate centric occlusion. This is the first of two installments.

An Important Problem

It is realized that the subject of vertical dimension is one of the most important problems in the construction of full dentures, (Porter,² Smith³). Innumerable patients cannot wear full dentures or have continual difficulty in using them, principally because accurate vertical dimension of the natural dentition was not reproduced in the full dentures. Young⁴ states that 90 per cent of full dentures failures are due to the fail-

ure in obtaining the proper centric relation (vertical dimension).

Use of Phonetics—Freuler⁵ and Gillis⁶ have made efforts to establish vertical dimension through the use of phonetic sounds but the use of phonetics has been empiric and inaccurate. None has succeeded in establishing vertical dimension with the accuracy that is now possible. Formerly, in establishing vertical dimension the dentist has relied on his ability to judge the proper height by instruments and methods of doubtful value.

Accepted Theory—Swenson⁷ and Hurst⁸ state that there is no exact scientific nor absolutely reliable technique available for the determination of vertical dimension. This belief is generally accepted by the dental profession. The use of gothic arch tracings, cephalometric x-rays, and freeway space listed by Swenson⁹ while important in themselves, are not now necessary nor are they sufficiently accurate or practical in the determination of vertical dimension during construction of full dentures.

Natural Method Applied—The natural vertical measurement should be taken and recorded on the patient's record card *before* the loss of the remaining teeth. It can then be reproduced in full dentures immediately or

many years later, regardless of the amount of ridge resorption present. Should the patient move to a distant place the record can be sent to another dentist to be used in the construction of full dentures or the reestablishment of a closed bite in old dentures.

In this presentation the establishment of vertical dimension is placed on an exact scientific basis so that it can be determined and recorded in terms of millimeters, and reproduced later in full dentures.

Phonetics

Webster¹⁰ defines phonetics as the "science of speech sounds considered as the elements of language; it is the study of their formation by the speech organs . . ."

The use of phonetics in full denture construction is highly important and is a practical method of establishing and measuring proper centric occlusion of each patient. The part of phonetics that is of interest to the dentist for the determination of vertical dimension is the position of the mandible during the formation of the various sounds.

Phonetic Sounds in English—Teachers of speech to the deaf and hard of hearing divide the English language into a number of phonetic sounds. Yale¹¹ divides the English language into 44 phonetic sounds as shown in Figure 1, with some example words to identify the correct phonetic pronunciation. In this illustration is also shown the number of millimeters between the upper and lower

¹Smith, Earle S.: Importance and Methods of Securing Vertical Dimension and Centric Relationship Records in Complete Denture Prosthesis, Iowa Dental Bulletin 34:12-15 (Feb.) 1948.

²Porter, Chastain G.: Vertical Relation, the Enigma of Complete Denture Construction, Dental Survey 26:806-808 (June) 1950.

³Smith, Earle S.: Methods of Securing Centric Relation and Other Positional Records in Complete Denture Prosthesis, J.A.D.A. 28:37-43 (Jan.) 1941.

⁴Young, Harry Allen: Diagnosis of Problems in Complete Denture Prosthesis, J.A.D.A. 39:185-200 (Aug.) 1949.

⁵Freuler, Franz: (Basel, Switzerland) Mschr. f. Zahnk 47:1147-1164 (Nov.) 1937.

⁶Gillis, Robert: Registration of the Denture Space, University of Illinois, College of Dentistry Telephone Extension Course, March 13, 1950.

⁷Swenson, Merrill G.: Complete Dentures, ed. 2, St. Louis, The C. V. Mosby Co., 1947, pp. 88 and 411.

⁸Hurst, William W.: Selected Phases of Complete Denture Prosthesis, J. 2nd Dist. Dent. Soc. of New York State 32:99-109 (March) 1946.

⁹Swenson, Merrill G.: Complete Dentures, ed. 2, St. Louis, The C. V. Mosby Co., 1947, pp. 90 and 411.

¹⁰Webster's Collegiate Dictionary ed. 5, Springfield, Mass., G. & C. Merriam Company, 1941, p. 747.

¹¹Yale, Caroline A.: Formation and Development of Elementary English Sounds, Northampton, Mass., Metcalf Printing and Publishing Co., 1946.

Consonant Sounds	Examples	Speaking Centric Space	Wider Speaking Spaces
h	<i>he</i>		10 mm.
wh	<i>what</i>		12 mm.
w	<i>want</i>		12 mm.
p	<i>pan, open, hop</i>		12 mm.
b	<i>box, baby, tub</i>		10 mm.
m	<i>me, lamp, him</i>		12 mm.
t	<i>top, city, cart</i>		4 mm.
d	<i>dog, garden, old</i>		4 mm.
n	<i>no, any, pin</i>		4 mm.
l	<i>lark, fold, pail</i>		9 mm.
r—	<i>run, laurel</i>		7 mm.
k, or c, ck	<i>keep, cart, crockery, book</i>		9 mm.
g-l	<i>go, again, dog</i>		10 mm.
ng, or n(k)	<i>singer, ring, thank</i>		4 mm.
f, or ph	<i>/an, soft, if, telephone</i>		6 mm.
v	<i>voice, seven, save</i>		10 mm.
th-1	<i>thin, author, moth</i>		10 mm.
th-2	<i>the, father, with</i>		10 mm.
s, or c(e), c(i), c(y)	<i>sit, basket, yes, cent, cider, cypress</i>	3 mm.	
z, or s-2	<i>zone, frozen, buzz, his</i>	3 mm.	
sh	<i>she, bushel, fish</i>	3 mm.	
zh, or s-3, z-2	<i>measure, azure</i>	3 mm.	
ch, or tch	<i>chair, preacher, larch</i>	3 mm.	
j, or g-2, —ge, dge	<i>jump, gem, legion, age, judge</i>	3 mm.	
y—	<i>you</i>		8 mm.
x—ks	<i>box</i>	3 mm.	
qu—kwh	<i>quite, inquire</i>		6 mm.

teeth from centric occlusion to the various levels of speech. The method of determination of these levels will be described so that its importance to the establishment of centric occlusion can be realized.

Positions of the Mandible—The pronunciation of the various phonetic sounds (Fig. 1) will cause the mandible to assume a certain position in relation to the maxilla: (1) Some phonetic sounds will cause the mandible to be very close to the maxilla,

1. Table of 44 phonetic sounds of the English language

(2) other phonetic sounds cause it to be far from the maxilla, and (3) other sounds in various positions in between the closest level and the widest level of the mandible. The latter phenomenon can be noted while watching a person speak. It is particularly interesting to observe the various levels of the mandible on performers singing on the television screen. Figure 2 shows the position

of the tongue and the mandible in the pronunciation of various phonetic sounds as taken from the Volta Review.¹²

The Role of the Tongue in Pronunciation—Haycock¹³ states, "The higher the tongue the less the amount

¹²The Volta Review, Speech Diagrams, the Volta Bureau, Washington, D.C. 16:207-215 (April) 1914.

¹³Haycock, G. Sibley: The Teaching of Speech, Washington, D.C., The Volta Bureau, 1932, p. 82.

Vowel Sounds

oo-1 long, or (r)u—e, (r) ew	food, rule, brew	8 mm.
oo-2 short	book	11 mm.
o long, or oa, —o, ow-2	stone, boat, potato, snow	15 mm.
aw, or au, o(r)	saw, haul, for	12 mm.
o short	not	12 mm.
e long, or—e, ea-1, e—e	see, we, meat, these	5 mm.
i short, or —y	pin, candy	7 mm.
a long, or ai, ay	cake, hail, say	13 mm.
e short, or ea-2	red, bread	10 mm.
a short	cat	12 mm.
a(r)	arm	13 mm.
u short, or—a, —ar, —er, —ir, —or, —ur, —re	cup, china, collar, flower, their, color, flour, there	7 mm.
ur, or er, ir	fur, her, sir	7 mm.
i long, or igh, —y	side, night, by	14 mm.
ou, or ow-1	proud, cow	15 mm.
oi, or oy	oil, boy	14 mm.
u long, or ew	use, few	10 mm.

Sounds and example words from Caroline A. Yale's book on
Formation and Development of Elementary English Sounds

of mouth opening." Because the tongue plays such an important part in the utterance of a sound and because the position of the mandible is primarily determined by the position of the tongue, the dentist can use this phenomena to help in the determination of the vertical dimension.

Measurements in Millimeters—Success with this method depends upon the ability of the dentist to induce the patient to pronounce the various sounds normally and accurately. On some occasions there can be a difference of 1 or even 2 millimeters in the levels of the mandible in the pronunciation of a single sound if measurements are not taken properly or if the patient pronounces the sound while in a different frame of mind.

Changes Effected by Mood—If the patient pronounces a sound in a normal manner the level of the mandible is in a certain position. If the same patient should pronounce the same sound while angry, or during delib-

erate diaphragmic speech (as in public speaking) the level of the mandible may be about 1 or 2 millimeters wider than normal. Therefore, measurements should be made while patients are relaxed, the head and torso erect, while sitting in a natural position.

Organs of Speech not Fixed—1. It will be found that the levels of the mandible will be in different positions for different patients for the same sound. Some sounds will bring the mandible to the closest level, others to wider levels of varying degrees.

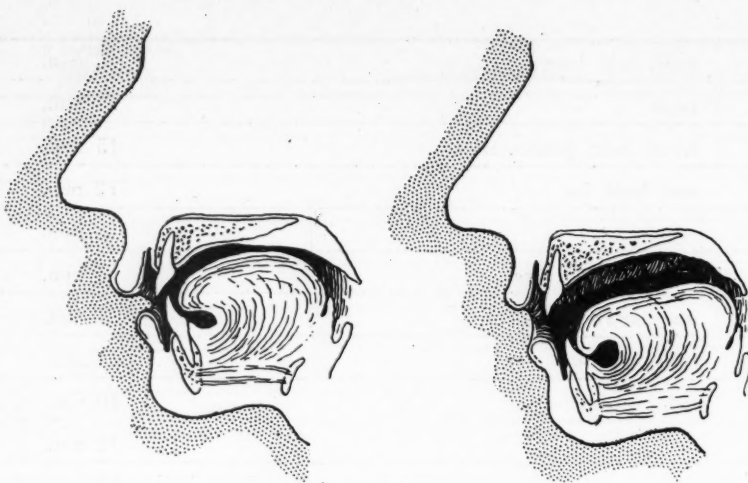
2. For example, the sound S in Yes separates the upper and lower anterior teeth 3 millimeters in the patient's phonetic analysis as shown in Figure 1, but it does not mean that everyone's jaws are separated the same distance for the same sound. All patients are different and their sounds separate the upper and lower teeth in different degrees for corresponding sounds.

3. Haycock¹⁴ stresses the fact that the organs of speech (the mandible included) are not in a fixed position at all times to form a particular sound for all persons. He states, "The human mouth is not standardized. Mouths are not all alike. They vary quite as much as faces do . . . a good sound is sometimes forthcoming when an important articulating organ, say the tongue, does not take up what is considered to be the standard position for that sound. On the other hand, a pupil may place his tongue in what seems to be the correct position for a particular sound and fail to produce the sound satisfactorily. The explanation of this is that *no organ of speech has an absolute position*. All positions are relative."

Phonetic Principles Applicable in all Languages—According to Fletcher,¹⁵ "Although there are a great many different languages spoken in different parts of the earth and each

¹⁴ibid., p. 124.

¹⁵Fletcher, Harvey: *Speech and Hearing*, New York, D. Van Nostrand Company, 1946, p. 4.



2A. The position of the tongue and mandible forming the sounds S as in Yes and His.

2B. The position of the tongue and mandible forming the sounds O as in Poll and Ohio.

language has a system of speech sounds of its own, there is a great similarity among these fundamental speech sounds. This is necessarily true since there is only a limited range of distinct sounds that can be made by the organs of speech. Although the mechanism of producing particular speech sounds in the various languages is somewhat different, the general mechanism of producing speech is similar for all people."

Languages Other Than English—The dentist speaking languages other

than English should list all the phonetic sounds of a particular language as is done in the English language (Fig. 1). He should then analyze and measure the levels of the mandible in the manner to be shown and determine which sounds cause the mandible to fall in a position on the closest level and on the wider levels in relation to the maxilla. He will probably find that the sibilants or hissing sounds will be the ones which most constantly bring the mandible to the closest speaking level (speaking cen-

tric level) in relation to the maxilla.

Relations of Jaws

The vertical relationships of the jaws that have been recognized in the past have been centric occlusion and centric relation. A third relationship, speaking centric, has been described by the author.¹⁶ This important speaking centric is the closest level of the mandible to the maxilla of the patient's speaking range as well as the furthest forward position of the mandible caused by any or all of the phonetic sounds of rapid speech. After further research the vertical relationships of the jaws shown in Figure 3 can be classified as follows:

1. Centric Occlusion
2. Centric Relation
3. Speaking Range
 - (a) Speaking Centric Level (closest speaking level)
 - (b) Wider Speaking Levels

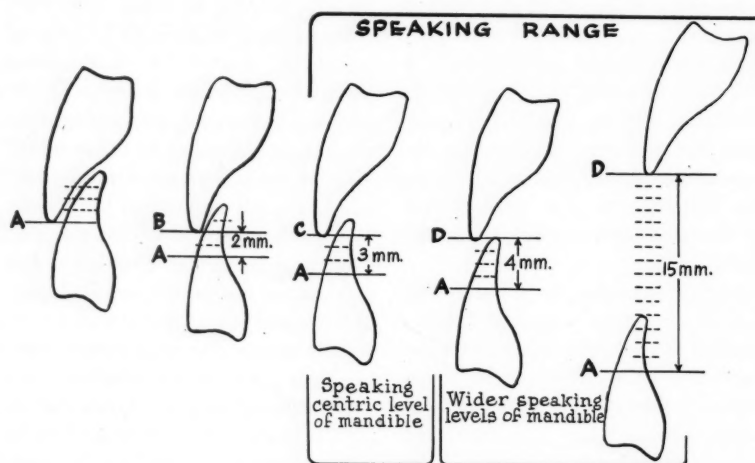
Centric Occlusion—This relation is defined by Anthony¹⁷ as "the harmonious inter-relationship of opposing teeth." It is the relationship of the jaws when the upper and lower teeth are in normal occlusal contact and the condyles are at rest in the posterior part of the glenoid fossae.

Centric Relation (Physiologic Rest Position)—1. Sears¹⁸ describes this relation as the rest relation or "that relation to which the mandible tends to return after opening or closing. Swallowing closes and speaking opens the relation temporarily but when the muscles relax after either effort the rest relation is naturally assumed again."

2. Thompson¹⁹ has used the centric relationship of the jaws to determine vertical dimension.

3. The author has found that the determination of centric relation is difficult. Its use has been discarded in favor of the more accurate, practical, and scientific method of using phonetics, as presented.

Speaking Range—The area cov-



3. All the various levels of the mandible in relation to the maxilla as well as the various spaces. (A) Centric occlusion line. (B) Central relation line. (C) Speaking centric line. (D) Wider speaking line. (AB) Centric relation space or freeway space. (AC) Speaking centric space. (AD) Wider speaking space.

¹⁶Silverman, Meyer M.: Speaking Centric, DENTAL DIGEST 55:106-111 (March) 1950.

¹⁷Anthony, L. Pierce: Prosthetic Dentistry, Philadelphia, Lea & Febiger, 1942, p. 217.

¹⁸Sears, Victor H.: Principles and Techniques for Complete Denture Construction, St. Louis, The C. V. Mosby Co., 1949, p. 171.

¹⁹Thompson, John R.: The Rest Position of the Mandible and its Significance to Dental Science, J.A.D.A. 33:151-180 (Feb.) 1946.

	Forward movement of mandible in varying degrees	No forward movement of mandible
Number of patients	111	89
Percentage of patients	55%	45%

4. Analysis of 200 patients showing the forward movement of the mandible from centric occlusion to speaking centric.

ered by the positions of the mandible during the pronunciation of the various phonetic sounds of any language is defined as speaking range.

The speaking range usually opens the mouth or increases the vertical during talking more than centric occlusion and centric relation although exceptions are noted. Each phonetic sound is made with the mandible in a definite vertical position.

The speaking centric, or closest levels sounds, are generally constant and can even vary in each person depending (1) upon the position of the patient's head in relation to the body, and (2) upon the rate, sharpness, and vigor of pronunciation.

During speech the mandible will move into the various levels of speaking range; namely, the speaking centric level (closest speaking level) and the various wider speaking levels (Fig. 1).

Resume of All 50 Patients

Forward movement of mandible while speaking (from centric occlusion to speaking centric)	Number of patients
1 mm.	24
1 1/2 mm.	5
2 mm.	42
2 1/2 mm.	1
3 mm.	23
4 mm.	8
5 mm.	6
6 mm.	1
8 mm.	1

5. Analysis of the 111 patients of Figure 4 moving the mandible forward from centric occlusion to speaking centric.

Classifications: The speaking range is divided into two levels for classifications: 1. Wider speaking levels are usually numerous in each patient and should not be considered in the measuring of vertical dimension because the determination of the distance between the mandible and maxilla is difficult.

2. The speaking centric level is the most accurate due to the fact that the mandible is usually at a constant level when its phonetic sounds are enunciated. *It is, therefore, advisable to use the measurements of the speaking centric level (closest speaking level) in order to determine the vertical relationship of all patients.*

The Most Constant Level: The speaking centric level is the most constant of the entire speaking range. Some of the author's rechecked controls have remained constant since February 1950. It is believed to remain constant throughout life and controls are being recorded to verify this assumption.

If the measurement is taken when the patient speaks normally under normal circumstances of posture and vigor of speech, the measurement in the same person should, with few exceptions, remain constant.

According to Dewey²⁰ the sibilants or hissing sounds, S, Z, SH, ZH, CH, and J which usually cause the speaking centric level will cover 9.35 per cent of English reading and conversation. It is, therefore, important that the speaking centric level of the mandible be respected during construction of full dentures, or clicking of teeth and unnecessary resorption, with failure, will result.

Forward Movement of the Mandible—It has been reported by the au-

²⁰Dewey, Godfrey: *Relative Frequency of English Speech Sounds*, Cambridge, Mass., Harvard University Press, 1923.

thor¹⁶ that some mandibles move forward during the function of speech. In the analysis of 200 patients (Fig. 4) in the author's practice, it has been found that some forward movement of the mandible during speech occurs in 55 per cent of the cases. Figure 5 shows the number of patients moving the mandible forward in varying number of millimeters as listed. These patients measured for forward movement during speech are the 111 patients shown in Figure 4 moving the mandible forward from centric occlusion to speaking centric. Of these 111 patients moving the mandible forward during speech, 32 patients or 29 per cent moved forward the total distance of their overjets to an edge-to-edge bite during some or all phonetic sounds of speech.

Method for Measuring: The movement forward can be measured by comparing the distance from the labial of the lowers to the labial of the upper anteriors (overjet) when the jaws are in centric occlusion to the overjet during speaking centric (when the mandible is in the most forward position on whatever sound causes that position). Although vertical dimension is considered the main problem of "taking the bite" for determination of jaw relations, the forward movement of the mandible must not be overlooked for the proper setting of the anterior teeth to prevent displacement of dentures as well as the attainment of satisfactory esthetic results.

Variations in Movement: When the mandible moves forward, it does so during normal rapid speech. Some patient's mandibles move forward during the pronunciation of all their phonetic sounds. Some move forward on just a few sounds. Patients have been noted where the mandible will move forward on a few sounds and when the patient smiles or does not enunciate the sounds normally, the mandible will not move forward at all. This emphasizes the importance of checking patients under normal speaking conditions.

(To be continued)

The Cavalier

3500 Fourteenth Street, N.W.

Gross RADIOGRAPHIC SURVEY on Three Negatives

ROBERT G. MILLER, D.D.S., Baltimore

DIGEST

The technique described in this article is not intended to supplant the present fourteen to sixteen intraoral full series. It is analogous to the microfilms used in tuberculosis survey in which, if disease is suspected, a detailed roentgenogram is taken.

The technique is definitely applicable for dental public health programs, for example, for

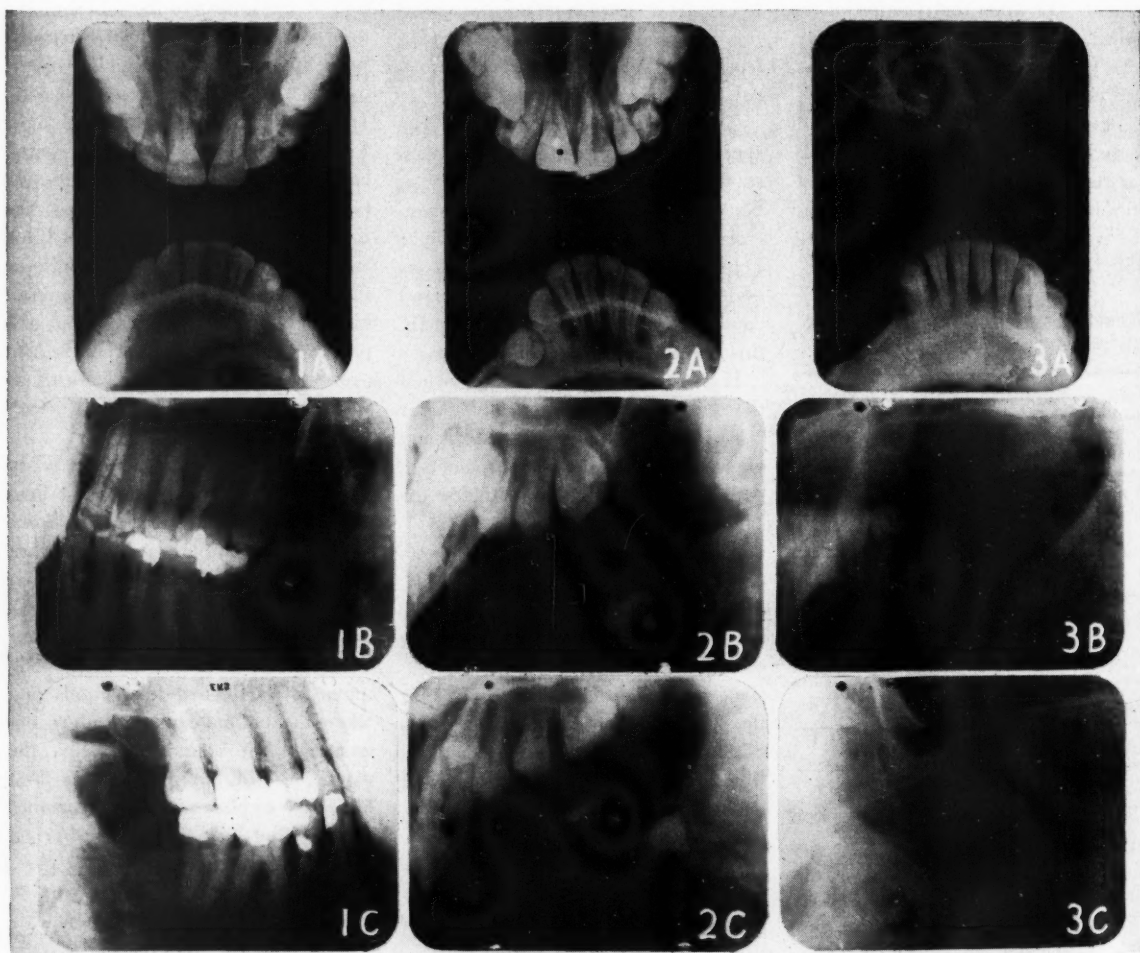
school children and screening of industrial plants, thereby promoting greater public dental education.

1A, 1B, and 1C. Represent conditions shown in the 3-negative radiographic survey.

2A, 2B, and 2C. Developing teeth as represented in the 3-negative radiographic survey.

3A, 3B, and 3C. The 3-negative survey used in a partly edentulous mouth.

It must be clearly understood that in this technique specific detail is not obtained. However, gross pathologic conditions can be readily interpreted and the technique is adaptable in the following situations: 1. In exodontia, for full mouth extractions. 2. In pedodontia, to check eruptive stages. 3. In periodontia, to check and correlate bone level. 4. In cases of trismus or other clinical conditions which make film packet placement particularly painful.



Advantages of the Technique

This technique is a combination of both intraoral and extraoral techniques plus a modification of both and is valuable for the following reasons:

1. It is especially adaptable for children because of the size of the packet manufactured.
2. A gross radiographic examination may be made on three packets with four exposures, reducing operating time at least 80 per cent over the time required for normal fourteen to sixteen intraoral full series of radiographic pictures (Figs. 1, 2, 3).
3. The patient is subjected to less radiation. Discomfort to the patient is entirely alleviated.

Technique

1. Place occlusal packet (2¼ by 3 inches speed type) on the side of the patient's cheek. The upper anterior corner of the packet is placed slightly anterior and at the same level as the ala of the nose. The superior border of the packet is placed parallel to a line from the ala of the nose to the anterior superior attach-

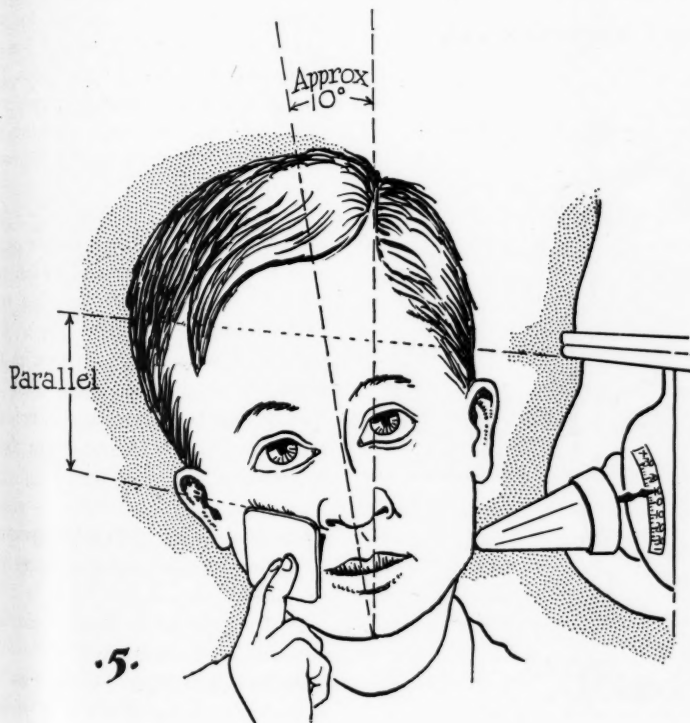
ment of the ear to include the upper and lower roots of the posterior teeth and cuspids (Fig. 4).

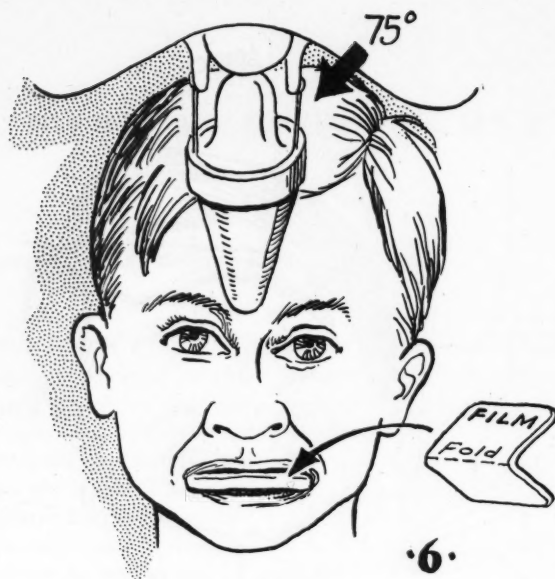
2. The patient's teeth must be in occlusion.

3. The packet may be held with the patient's fingers of the same side, making sure that the packet is not bent. The patient's head is leaned laterally toward the side on which the packet is placed, with a deviation of 10 degrees to 15 degrees from the sagittal plane (Fig. 5). The tube side of the packet is against the cheek, the lead side is outward.

Point of Entry—Using a vertical angle of about zero degree to plus 10 degrees, the point of entry with the x-ray cone is just inferior to the lower border and angle of the opposite side of the mandible. The cone should be aimed at the occlusal plane at approximately the second molar region of the packet side. The proper horizontal angle may be obtained by paralleling the long axis of the head of the x-ray machine with the long axis of the packet.

Exposure Time—This placement is adaptable to the right and left side of the face and will give an x-ray negative of the upper and lower posterior teeth and cuspids. The expo-





sure time for children is 7 seconds, and about 2 seconds more for adults.

One Packet is Used—1. The upper and lower anterior teeth are taken on one packet (2¼ by 3 inches speed type) with two exposures. This packet is folded in half in the direction of its length so that the lead side is facing the lead side (Fig. 6).

2. This is placed in the patient's

mouth with the fold toward the outside, with the film extending just slightly anterior to the incisal edge of the upper incisor teeth. The occlusal plane and packet must be parallel to the floor.

3. The patient then brings his teeth in occlusion, retaining the film by biting. The upper teeth are radiographed by using a vertical angle of

about 75 degrees plus (Fig. 6).

4. For the horizontal angle the long axis of the head of the machine is parallel to the visible portion of the packet.

Determining the Angle—1. With the packet still retained in the same position by the patient, the tube is directed upward at a point of entry just inferior to the symphysis. The vertical angle is upward at about minus 75 degrees. The horizontal angle is determined the same as in the upper anterior region.

2. If using the type of x-ray machine with which a maximum vertical angle of minus 20 degrees can be obtained, the patient's head may be placed at an angle of about 45 degrees posteriorly in reference to the horizontal, with a vertical angle of minus 20 degrees.

3. The point of entry is just inferior to the symphysis; and the horizontal angle is determined in the same manner as that used for the upper anterior.

Upper and Lower Views on One Negative—The result of the technique described produces an x-ray of the upper anterior teeth on one half of the negative and the lower teeth on the other half of the negative. The exposure time is 1 second for the upper anteriors and 1 second for the lower anteriors, using speed film. The exposure times previously mentioned are based on an x-ray machine operating at 110 volts or 63 kilovolts and 10 milliamperes.

Improvements Indicated — Undoubtedly a film with a better emulsion will be manufactured which will provide greater detail for this type of technique. A slightly larger film will be advantageous for use with the adult. It should be noted that although engravings are best much detail may be lost in transition from negative to printing.

Summary of Advantages

1. Gross radiographic aspects are provided.

2. The patient is saved time, annoyance, and discomfort.

3. The technique serves as a screening process. If the type of dis-



case is doubtful a small intraoral film may be taken as a check.

4. The technique is satisfactory for full mouth extractions.

5. Recommended for children, especially for checking eruptive stages of teeth.

6. The operating time is 80 per cent less than the time required for the 14 or 16 intraoral series.

7. The loading of the cassette is eliminated.

8. The film can be held more easily by the patient.

9. Time in the dark room is saved.

10. There are fewer films to file, thereby conserving storage space.

11. Time is saved in mounting and examining films.

Baltimore College of Dental Surgery,
Dental School, University of Maryland.



Acne—Treatment Considerations

The treatment of common acne (Acne Vulgaris) is one based on perseverance on the part of the patient. A simple effective program in which active young people can be expected to persevere is desired.

Emphasis is placed on faithfulness in following the treatment. The patient is warned not to be discouraged if no response is evident in several weeks' time.

The aim of reducing the oiliness of the skin is explained. If he has misconceived his eruption to be a sexual stigma or social disgrace the patient should be enlightened and reassured.

The basic essentials of treatment are the following: (1) Wash the face at least three times a day with any pure nonmedicated cake soap; (2) Do not apply oily substances to the skin or hair; (3) Shampoo once or twice a week (in young men short haircuts are recommended); and (4) Apply a sulfur lotion such as lotio alba N.F. at bedtime if the skin is not irritated.

No fetish is made of the diet. Patients are advised to eat a wholesome balanced diet including, meats, veg-

MEDICINE

and the

Biologic

Sciences



etables, fruits, cereals, and dairy products. Patients are advised that chocolate or nuts in any form and foods fried in deep fat, such as doughnuts, are generally considered harmful.

Vitamin A and iodides have been both advocated and condemned.

Therefore, it seems best to ignore them. Thyroid is administered only in the presence of a low basal metabolic rate and hypercholesteremia. Ultraviolet light treatments are not given.

While patients are told not to push or squeeze their lesions, they are instructed in the atraumatic use of the comedo extractor when this is indicated. Make-up is not prohibited to girls who wish to use it for an evening's outing.

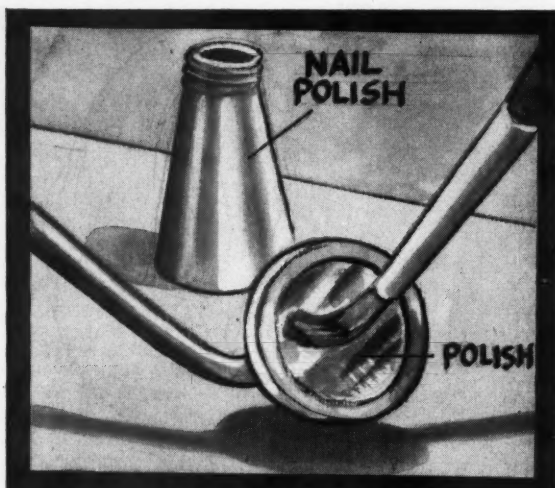
If there are no signs of improvement after a two months' period of treatment in a conscientious patient with severe acne which threatens to cause permanent disfigurement, weekly x-ray treatment may be considered. The sulfur lotion is omitted. Such patients should be over eighteen years of age or approximately mature in growth and stability.

The use of x-ray treatment in inflammatory disease of the skin is fraught with danger to the irradiated areas. One cannot accurately judge the tolerance of the skin.

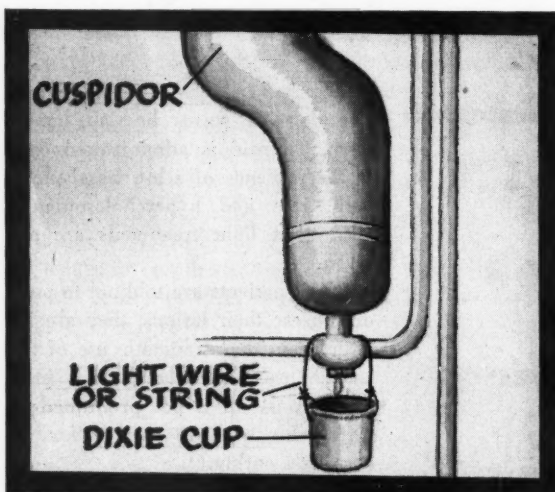
Acne is, as a rule, a self-limited disease. Damage to the skin by x-ray is not only permanent but progressively hazardous. When treatment failures occur an effort is made to

(Continued on page 274)

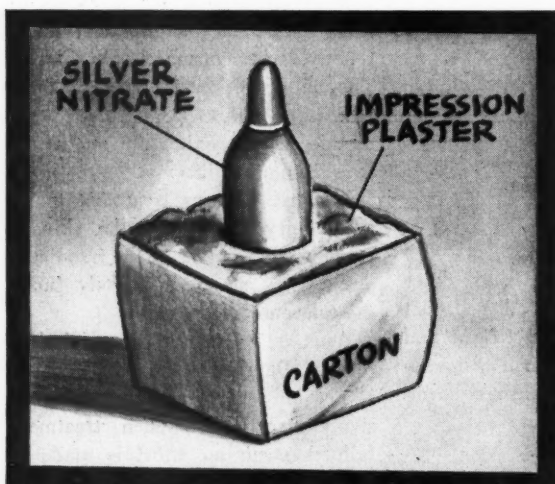
1



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3



Clinical and Laboratory Suggestions

Mouth Mirrors for the Airbrasive Technique

Robert W. Gale, D.D.S., Albany, N.Y.

When a mouth mirror is used in the airbrasive technique cloudiness appears on the mirror. In order to overcome this condition the mirror may be coated with colorless nail polish. After it is completely clouded by the airbrasive material, the coating may be removed and a fresh one applied.

Preventing Cuspidor Condensation from Dripping on the Floor

Lester Parks, D.D.S., Toronto

A paper cup is suspended by a wire from the pipes at the bottom of the cuspidor. The water of condensation drips in the cup and prevents it from running on the floor. The cup may be tilted to empty when full so the cup may be used again.

Avoiding Silver Nitrate Stains

A. W. Epps, Jr., D.D.S., Sanford, Florida

3. Place a small bottle of silver nitrate in a small carton filled with a creamy mixture of plaster of paris. Hold the vial in place until the plaster sets. The bottle will be held upright and enable one to handle the carton instead of the silver nitrate bottle. This prevents unsightly stains of the fingers.

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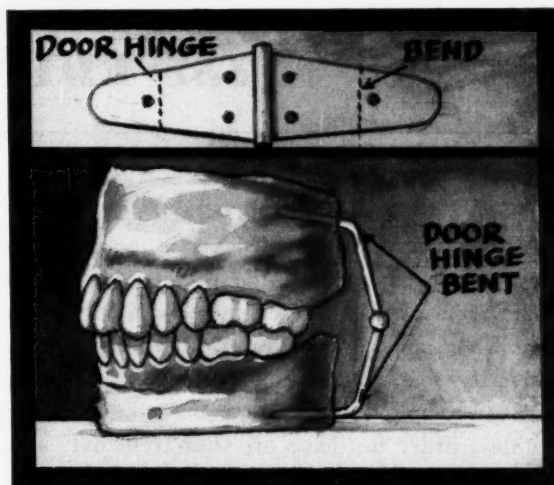
You do not have to write an article. Furnish us with rough drawings or sketches, from which we will make suitable illustrations; write a brief description of the

SUGGESTIONS . . .

An Inexpensive Articulator for Study Models

M. Kottler, D.D.S., Newark, N.J.

4. An inexpensive door hinge may be bought in the 5 and 10-cent store. The ends of the hinge are bent to simulate an articulator. The models are mounted on the hinge with plaster. The holes in the hinge will be filled with plaster and thus keep the model in position.

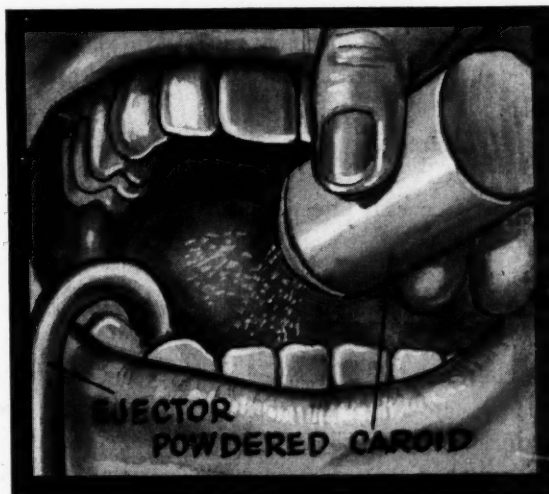


4

The Elimination of Thick Saliva

L. L. Murphy, D.M.D., Hood River, Oregon

5. When one encounters a patient with thick ropy saliva, sprinkle a small amount of powdered caroid on the floor of the mouth. The saliva becomes thinner immediately.

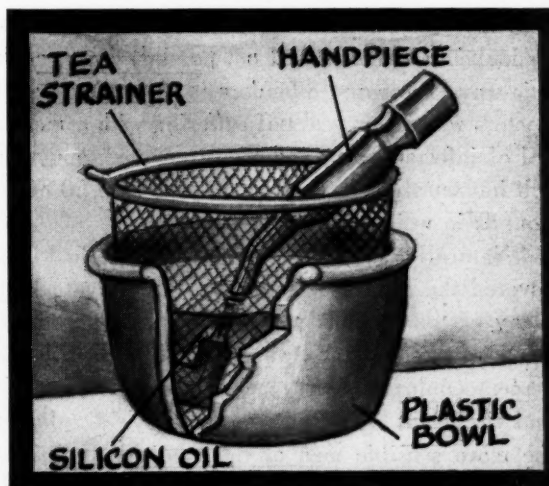


5

Saving Silicon Sterilizing Oil

Charles Nash III, D.D.S., Tupelo, Miss.

6. To conserve silicon sterilizing oil, place the handpiece in an ordinary tea strainer that is fitted over a plastic bowl. After sterilizing, the strainer is lifted from the bowl and the oil is conserved.



6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time. Turn to page 278 for a convenient form to use.

Send your ideas to: Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

The EDITOR'S Page

MANY OF our younger colleagues in the profession have never experienced the orgies of wholesale tooth removal that were common twenty-five years ago. Thousands of people were mutilated and lost perfectly sound and valuable teeth in the blind therapy to improve some systemic condition. The ruthless order to "have all your teeth out" rang through the medical offices of the country and dentists responded to the order with the same kind of unwholesome enthusiasm.

We have now swung to the other extreme where many otherwise thorough physical examinations ignore the dental tissues as possible foci of infection.

It is refreshing to find in the excellent *medical journal*, GP, this historically accurate, and sensible editorial on oral infection:

"Back in 1916 Frank Billings and E. C. Rosenow startled the medical world with their pronouncement that many diseases could be relieved by the removal of focal infections, mainly in the teeth, the tonsils, the paranasal sinuses, and the prostate gland. In the following 15 years it was a lucky patient who got out of a doctor's office without having had to sacrifice his teeth and his tonsils.

"The tragedy was that perfectly normal or usable teeth were often removed in a vain effort to cure some disease such as migraine, or tic douloureux, or leukemia, which could not possibly be cured in this way. The worst offenders in this regard were doctors who, after years of suffering with a mouthful of infected teeth, had them removed, and then felt immensely better and perhaps gained 20 or 30 pounds in weight.

"Naturally such men felt that they had discovered the elixir of youth, and the way to help many of the patients who came into their offices. Some of these doctors, when told by a dentist and a roentgenologist that a patient's teeth were sound and vital, said 'Take them out anyway!' Gradually the more sensible men of the medical profession began to see that much of what was being ad-

vocated and done was foolish, unjustifiable, and unscientific. Teeth and tonsils were being removed for diseases like Hodgkin's disease or an old valvular heart lesion, or a rheumatoid or senescent arthritis when there was no available evidence to show that focal infection had anything to do with the disease, much less was the cause of it.

"Many dentists rebelled at being asked by physicians to extract teeth which they felt were perfectly good and sound, and without which the patient would have to use plates.

"Gradually the excitement quieted down, and a number of men wrote articles begging their colleagues to use a little more discrimination, and to remove foci of infection only in those cases in which one could hope that some good would result. Most men came to agree that the removal of foci was most likely to help in cases of a certain type of infectious arthritis, and it was not likely to help in cases of rheumatoid arthritis, or senescent arthritis, or perhaps even fibrositis.

"Today the pendulum has swung, perhaps too far, and many physicians are forgetting to ask the patient as he starts going through an examination, whether he has recently had his teeth x-rayed. Often when a dark shadow is to be seen around the end of a root, the doctor and the dentist advise that the tooth be retained because the patient has no symptoms which would indicate the presence of chronic infection."

We may take exception to two of the statements in the last paragraph of the editorial from the medical journal. First, the question to be put by the physician should not be "Have you recently had your teeth x-rayed?" but rather, "Have you recently had a complete dental examination?" Second, the "dark shadow" reference is neither scientific nor comprehensive. There is more to x-ray interpretation than is expressed in the "dark shadow" concept. Possible pulpal and periapical infections are to be evaluated, and likewise potential foci in the supporting soft and hard tissues. Root-end disease is only *one* form of dental focal infection.

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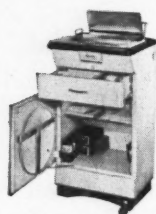
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(Continued from page 269)

establish the original hygienic measures as habit. An eventual improvement is hoped for while encouraging the psychologic adjustment of the patient to his disease.

Frazier, Chester, and Leeper, Row W.: *The Treatment of Common Skin Diseases*, M. Clin. North America 34:1473-1486 (September) 1950.



Infections from Syringes

An increase in the transmission of diseases by contaminated hypodermic syringes has been noted within the past few years. Ordinary precautions do not seem to be as reliable as was once thought.

Probably the major factor in the increase is due to the enormous increase in the number of drugs and other material given by injection as well as the venipuncture incidental to blood collection for so many tests or so much blood chemistry. Blood collection at banks and the use of the parenteral route for so many combinations which have been found most helpful to therapy have also contributed to the hazard which has been termed syringe-borne infections.

The more serious accidents, such as infections with syphilis, malaria, many pyogenic infections, and even tuberculosis can usually be traced to gross failures in techniques. However, some other infections have been attributable to methods of sterilization in common use. These methods were entirely adequate in the past but the transmission of many conditions not previously known has shown that these methods must now be changed.

Blood-borne viruses and hepatitis are among the conditions more prone to transmission. With increased use of syringe-injected antibiotics and the materials used in mass immunizations the danger of these syringe-borne infections has become a real hazard.

In mass immunizations the use of the "separate needle, common syringe" technique is safer than the use

of one needle and syringe for inoculation of several subjects.

For maximum security it is best to use an individual sterile needle and syringe and scrupulous care for each injection. Until disposable needles and syringes are commonly available, sterilization by dry heat (160° Centigrade) for a minimum of one hour, or auto-claving or boiling for about 30 minutes, is essential.

Evans, R. J., and Spooner, E. T. C.: *A Possible Mode of Transfer of Infection by Syringes Used for Mass Inoculation*, Brit. M. J. 2:185-191 (July 22) 1950. Symposium: *Syringe-Borne Infections*, Internat. M. J. 57:243-245 (October) 1950.



Diabetes and Visual Complications

Diabetes recognition and control are receiving considerable attention today. It has been established that the disease causes several undesirable complications in the body.

As the life of diabetic patients is prolonged, diabetes mellitus becomes the important reason for loss of vision. At least 40 per cent of patients who have had diabetes mellitus for fifteen years will have some form of retinopathy. The percentage rises to 85 for the group who have had the disease for twenty-five years or longer.

In cases of diabetes retinopathy the time at which the diabetes mellitus was first recognized should be recorded. All these patients should be told to report any visual disturbances.

The diabetic changes in the retina, which are usually bilateral, occur in the area surrounding the optic nerve. Numerous so-called round deeply situated hemorrhages or hemorrhagic spots occur, and, in addition there are usually small exudates. Treatment with rutin seems to improve the capillary fragility but not the diabetic retinal lesions.

The hope that early and physiologic control of the diabetes may avert later hopeless and disastrous complications is gaining ground. Close cooperation between the internist and the ophthalmologist is ad-

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vocated in an effort to evolve a method whereby retinal complications can be avoided and blindness from diabetes mellitus eliminated. Patients who have had diabetes mellitus for ten years or more should undergo regular ocular examinations at regular and relatively frequent intervals. The fundus of the eye should be carefully examined.

Knauer, W. J.: *Visual and Retinal Complications of Diabetes Mellitus*, Florida M. A. J. 37:88-91 (August) 1950.



Chickenpox

Parents usually regard chickenpox as an annoyance rather than as an illness to be feared. This attitude is understandable in view of the fact that the infection is generally not severe and complications are infrequent. Still, unforeseen dangers occasionally develop and in some instances may be attributed to neglect or failure to comply with proper instructions.

Secondary infections brought about by traumatizing the lesions may result in local abscesses or very rarely may lead to septicemia. Impetigo may follow the acute stage of chickenpox. Involvement of the appendix is not an extremely rare event. When it occurs it is likely to be at the height of the eruption and perforation often follows.

Because the lesions of varicella often appear on the mucous membrane of the mouth and throat it is perhaps not strange for vesicles to develop occasionally about the glottis or within the larynx. Under such circumstances when an infant or young child is concerned life may be threatened by asphyxiation.

Many dermatologists believe that the virus which causes herpes zoster is the same as that causing chickenpox. Many children who have never had chickenpox develop an eruption characteristic of this disease following exposure to herpes zoster. Rarely do the two diseases appear simultaneously in the same person. It is well to keep this relationship in mind. Isolation of patients with herpes zoster is just as essential as with patients having chickenpox.

There is no method for active immunization and measures sometimes adopted for passive immunity to establish immediate and temporary protection are unreliable. Human convalescent chickenpox serum has been used and now gamma globulin is likely to be given preference if passive immunity is to be attempted. The results are not dependable. If the pregnant woman has chickenpox at the time of delivery the baby may develop the disease as early as eight days after birth.

Treatment of the average chickenpox patient is generally a simple affair. Certain precautions should be observed. The hands should be kept clean and the fingernails cut short. These two precautions will greatly lessen the possibilities of secondary infection. In the extremely young child it may be necessary to splint the arm or require that white cotton gloves or mittens be worn for a few days. In reality the lesions scarcely ever cause severe itching but a child

is likely to pick at the vesicles or crusts. If the eruption is profuse on the scalp it may be advisable to cut the hair as short as possible.

Locally, calamine without the inclusion of phenol is a satisfactory application during the vesicular stage. Ointments may be useful after crusts have formed. A good cold cream will serve the purpose if it is desired to hasten the detachment of the crusts. However, the longer the crusts remain on uninfected lesions the less

chance there is of permanent scars.

If a patient has a great many lesions in the mouth a stomatitis may be troublesome and require special attention. Under these conditions a 2 per cent aqueous gentian violet solution may be used with an applicator once a day until relief is obtained. Older children may be given a mild alkaline mouthwash or simply penicillin lozenges.

There is no specific treatment for chickenpox. The administration of

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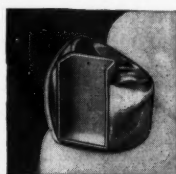
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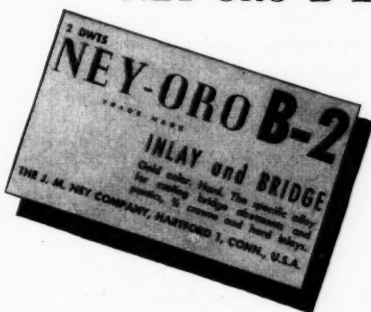


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penicillin is justified on the basis that it may act as a prophylactic agent against secondary infection, including bronchopneumonia. When a chickenpox patient is critically ill the possibility of appendicitis should always be considered. If the appendix

is involved the chance for recovery may depend upon an immediate operation.

Hoyne, Archibald L.: *Treatment of Chickenpox*, *Postgrad. Med.* 8:302-304 (October) 1950.

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Contra-Angles



In Praise of Idleness

The first thing that struck me was the title: In Praise of Idleness. What could this be doing in a medical journal? It was written by Sir Heneage Ogilvie, Surgeon to Guy's Hospital. A surgeon writing about something other than technique or case reports was unusual. The surgeons that I know are, like dentists, usually entirely unconcerned with essays or comments on human interest subjects. An essay on idleness would certainly be in that category.

Following some kind of perverse reading habit, I read the last paragraph in the essay first: "My thesis is the very simple one that the man who works hard and conscientiously does his most important work when he outspans his mind and allows it to wander at its own pace around the paths over which it has been rushing, and that science is advanced further in a short time by the informal chatter of a few light-minded friends over cocktails than by the formal exchange of papers or by any number of congresses." This paragraph should whet any appetite.

How often have I sat down to think and got nowhere. Unfortunately, we cannot think by pulling a switch, by using some power of the will, or setting ourselves in favorable surroundings. Nor do I believe that hanging one of those masterful and frightening signs "Think" over your desk helps. That sign always chills me to inactivity and I note that those who hang it before their faces are seldom erupting volcanoes of cerebration. This would seem to suggest that thinking is not a deliberate act but something that seems to spring into being when least expected. "The thought just struck me" is probably a truthful and penetrating observa-

tion. We have all had the experience of a thought striking us at a most unexpected time and place. There are the thinkers-while-shaving; the thinkers-while-driving; the thinkers-while-fishing. I have yet to hear a creative thinker report that his inspirations came to him while at work. That should be good enough praise for idleness.

Returning to the first of Sir Heneage's essay, we receive a clue why modern man suffers frustrations and mental turmoil:

"What we have come to call civili-

zation has upset the proper use of the mind. In olden days men were individuals. Each man learned from his parents, his fellows, and his elders, but his thoughts were his own thoughts, worked out by him from his gleanings, from his observations of the sky, the sea, the trees, and the animals, into a personal store of knowledge and opinion. Each man worked for a master, but he received his task in the rough to work out according to his own ideas. The journeyman builder was given, not a blueprint to follow slavishly, but a piece of stone to shape into a pillar that should fit one corner of the church that was rising in the meadow, and if he was instructed to decorate the capital he was free to work out a design that included his favorite dog or a caricature of his foreman. Throughout the day his mind was engaged on varied and interesting tasks, and at the day's end it needed and valued rest.

"Nowadays men are not asked or encouraged—indeed, are seldom allowed—to think. Their growing minds are molded at school on Government-sponsored primers, and thereafter they receive their opinions from books or newspapers. Their work is no longer personal or intelligent, but some small portion of a whole of which they have no conception, repeated without the use of any mental process several times a minute for fifty-five minutes in the hour, eight hours in the day, five days in the week, and eleven months in the year.

"Such a mind is permanently idle, and to it idleness does not mean rest. It has not been weaving patterns from rough materials, but has remained passive while ready-made and standardized patterns, mass-produced on the cheap to fit cortices of every grade and every race, were scribbled over it. When not so used it has no means of self-employment, no stores to lay down in the basement; and the primitive instincts of the herd—love, fear, hate, and greed—stir dimly in those caves of instinct and produce mass sentiments masquerading as thought, clichés and catchwords that form the con-

CLINICAL AND LABORATORY SUGGESTIONS

(See pages 270 and 271)

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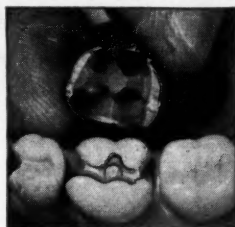
version and the wit of the moron.

"The active mind, on the other hand, may be working all the time and come to no harm if the work is congenial, interesting, and within its trained capacity. The artist can paint for hours without being aware of the clock; the surgeon can perform a four-hour operation of the greatest intricacy, at every stage of which he has to make decisions of prime importance, yet he feels no fatigue. But let the artist trudge around a picture gallery, or the surgeon try to watch a colleague for four hours, and both of them will be calling for a Guinness. The mind can work thus continually without tiring, and do so day after day, but it is not doing its best work. It is making decisions without storing them, collecting pictures without hanging them in the galleries, laying up a hoard of valuables which become treasures only when they are sorted out in relation to each other and properly displayed.

"Constant use of the mind does not lead to exhaustion any more than constant idleness leads to refreshment. What exhausts is effort rather than use, the performance of tasks that are distasteful or that are beyond easy fulfillment, the fear of failure because the training is inadequate, the intelligence insufficient, the experience too small and too recent. Even so, an internal-combustion engine suffers little harm when it is run for long hours within its capacity or for short bursts at full speed, but when it is constantly set to do the work of a larger engine by operating at full load for hours on end it very soon gives out."

Nowadays we are hearing a lot about the stress diseases and the diseases of maladaptation. We have learned that stress—bacterial, chemical, physical, or psychic—sets off a chain reaction that involves the endocrine glands and the autonomic nervous system. If we adjust to the biochemical and neurologic bombardment our organism returns to balance—to homeostasis. If, however, the organism continues in furious activity, even after the stress is removed, the body exhausts itself and is destroyed by an overdose of its

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In writing in praise of idleness Sir Heneage was not suggesting the slothful life or the life of mere vegetative existence. He was addressing himself to medical men and was advocating the idleness as a form of therapy for the three common stress diseases: hyperthyroidism, duodenal ulcer, hypertension.

These words are as descriptive of the career of the dentist as they are of the physician:

"The young man who has carried all before him in his medical school, who has good brains, clever hands, and a stout heart, would be a traitor to himself if he did not plunge unafraid into the battle, prepared to give and to take hard knocks until he has won through. But when he has so won, when the clash of steel sounds fainter behind him and he stands bloody and unbowed with a few comrades equally tough on the upper slopes, he is apt to keep the same combative outlook from mere force of habit, to go on fighting for fighting's sake and working because he has never done anything else. It is this prolonged and no longer needed exertion that is harmful. It is unfair to all those cultural sides of his nature that have had to be laid aside for a time. It is unfair to his wife and his family. It is bad for his thyroid, his adrenals, and his cardiovascular system. Above all it is bad for his surgery.

"It is to an audience of medical men, above all to an audience of surgeons, that a sermon in praise of idleness is necessary. We have seen that idleness is a part of function. The heart gives one gigantic heave that sends a dose of blood racing along the aorta; but systole lasts only one-third of a second, and for twice as long the heart muscle takes a rest. A meal is followed by a rest from eating, during which the stomach and proximal intestine break the food down to its elemental constituents. The gastric, pancreatic, and intestinal juices cease while the lower ileum and proximal colon absorb. The mental machinery works very much the same way. Impressions are

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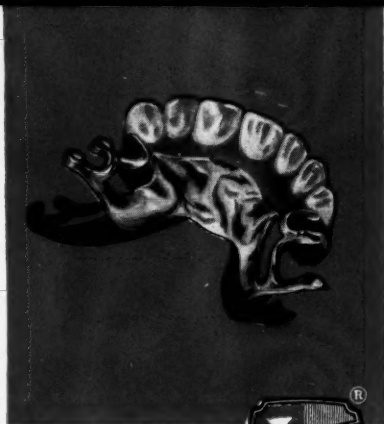
constantly being received by the eyes, the ears, the nose, and the hands. Some of these produce momentary reactions and are gone. Some, repeated or received with special strength, are laid down in the association centers as memories. But for the best use of these impressions it is important that there should be periods when the mind has nothing to do but look over its stores and sort them out.

"Most of us have passed through both of these phases, through spells of hard conscientious work and through spells of idleness. In the first we have acquired knowledge; in the second we have built up wisdom. In the first we have been worthy workers. In the second we have made, or

started the train that has brought us to, those personal contributions by which we hope to be remembered when we are dead. For the human mind which has been driven hard does its best work when the tension is outspanned and it is allowed to find the natural paths that shape themselves in idle periods."

As I watch the city rush-hour crowds, the impatient and impatient automobile drivers, the furious golfers, I see people killing themselves by an excess of their own energy. We are likely to label these people as dynamic and vital and in doing so imply that a needless expenditure of energy is an admirable trait. Actually, energy should be conserved to fulfill vital functions and

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not dissipated in unproductive action. The "human dynamo" is often a noisy machine that wears one to exhaustion if you are long in his presence. For depth of understanding, for pleasure in conversation, for comfort in companionship, I prefer the one who sings the praise of idleness. —E. J. R.

A New Treatment for Vincent's Infection

W. J. Linghorne, D.D.S., Toronto, and
D. F. Stedman, Ph.D., Ottawa

This discussion is restricted to the management of the acute phase of necrotic gingivitis and introduces a new and powerful therapeutic agent for this purpose.

An Effective Method of Treatment

From clinical tests of a wide variety of medicaments a treatment was selected for study consisting of (1) pentavalent inorganic arsenate, and (2) an oxidizing agent, used together.

This combination was markedly superior to all others tested and was also more effective than might be expected from results obtained by the use of either agent alone.

Composition of the Mouthwash

Of the formulas tested, the most effective form finally standardized is the following:

Potassium dihydrogen
arsenate25 grams

COPALITE

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prepared for a
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jacket crown.

Sodium dihydrogen phosphate	
monohydrate20 grams
Calcium dibenzoate50 grams
Magnesium	
dibenzoate25 grams
Loritol (cetyl polyglycol	
ether)015 grams

For use these solid ingredients are dispensed as needed: 3 1/4 ounces of 3 per cent U.S.P. hydrogen peroxide is diluted with 3/4 ounce of water, the solids added and dissolved as quickly as possible, by stirring or shaking.

The solids can also be combined with 9 grams of urea peroxide. This form is dispensed by the addition of 114 cubic centimeters (4 ounces) of water.

When dissolved in water urea peroxide gives the required amount of hydrogen peroxide, and the urea itself has a well known value in necrotic wounds.

Pharmacology of This Treatment

Arsenic—The arsenic in Fowler's solution and the usual inorganic arsenic salts are trivalent. If this form of

arsenic comes in contact with any tissue protein it becomes strongly attached through some of the essential sulphur groups. Two results are therefore produced:

1. Trivalent inorganic arsenic moves through tissue very slowly.
2. The protein is damaged and such trivalent arsenic is therefore extremely toxic.

Arsenic in the Pentavalent Form:

1. In this form arsenic does not become attached to the sulphur of proteins. In fact, pentavalent arsenic has little affinity for sulphur, as shown by the fact that in the usual analytic scheme fairly strong acid and heat are necessary for the precipitation of pentavalent arsenic as sulphide.

2. Arsenates are not hindered, therefore, in passing through tissue, and they also penetrate readily through the debris which usually fills infected pockets.

3. The arsenate reaches the pathogenic organisms readily and its effectiveness in Vincent's infection shows clearly that this arsenic compound is lethal to the organisms concerned as the formula is quite ineffective if the arsenate is omitted.

Arsenic Toxicity: 1. This arsenic compound was found to be five or six times less toxic, on the basis of its arsenic content, than is ordinary trivalent arsenic.

2. From the tests it was estimated (1) that one prescription, 4 ounces of the solution, could be taken by an average adult *daily* for long periods before trouble developed, and (2) for a large quantity taken at one time it would require about 4 prescriptions (16 ounces) taken together to reach the average lethal dose.

3. If as little as a teaspoonful of the complete mouthwash is swallowed, its peroxide content causes vomiting without other ill effect.

4. It was found that the type of body damage caused by the pentavalent arsenates is much less serious than that caused by the trivalent arsenites. Animals dosed daily with large amounts of the former until they reached a moribund state recovered promptly if the dosing was discontinued.

5. From this study, this treatment

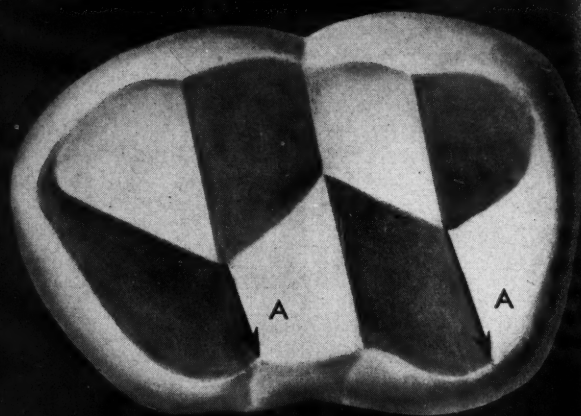
solution is about 50 times less toxic than Fowler's solution. The complete formula as dispensed cannot be swallowed and retained in appreciable amounts. Toxicity, therefore, appears of no importance in its use.

Tooth Etching—1. Placing a neutral arsenate solution in contact with the phosphates of the teeth causes the phosphate to dissolve and the arsenate to precipitate. This replacement reaction is a result of the isomorphous nature of the two ions.

2. After surface replacement of the tooth phosphate by arsenate the saliva gradually removes the layer of calcium arsenate, as a foreign material. The final result is an etching of the teeth similar to the results produced by an acid.

Reduction of Arsenates—By adding calcium, magnesium, and phosphate ions to the mouthwash, attack by arsenates can be reduced. Unfortunately, at any pH which may be used these ions cannot be added in an appreci-

designed specifically for plastic AND TO AVOID CUSPAL INTERFERENCE



NOTE

Note grooves A A in above upper first molar. Lower buccal cusps slide smoothly along these directional arrows with no mechanical interference.

● Note sharp cusp ridges; surfaces that meet at cusp ridges are flat and smooth.

Between lingual cusp ridges, instead of natural sulci there are two grooves directed inward and anteriorly following natural movement of lower jaw. Buccal cusps of lower molar slide along these grooves without mechanical interference. This unusual formation operates to keep cusp ridges sharp and prevent dimensional loss of teeth.

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Cambridge 39, Massachusetts, U.S.A.

able amount as calcium and magnesium phosphates are not very soluble.

This replacement reaction cannot be prevented but there is one method by which the composition of the solution can be adjusted so that damage to the teeth does not occur.

Method—1. A solution supersaturated with respect to calcium and magnesium phosphates — the main constituents of teeth, is utilized.

2. Supersaturated solutions tend strongly to deposit their excess solids,

particularly if placed in contact with the solid.

3. The solution noted, therefore, deposits the excess phosphates as a precipitate merely on storage, or if placed in the mouth similar deposition will occur on the surface of the teeth.

4. If this chemical deposition of precipitated calcium phosphate on the teeth is as rapid, or more rapid, than the replacement reaction, it is clear that the tooth surface itself cannot be

attacked by the arsenate ion.

Theory Confirmed—It was found that a supersaturated solution of calcium phosphate (made by adding CaCl_2 solution to a separately prepared solution of the Na_2HPO_4) entirely prevented all etching by the arsenate in the above recipe, while solutions containing calcium phosphate only up to saturation concentrations did not do so.

The Production of Supersaturated Solutions

1. It proved possible to prepare solutions supersaturated with respect to Ca and Mg phosphates by splitting these compounds into their respective ions, and adding these ions to the mixture in the form of other soluble salts: sodium phosphate, and as calcium and magnesium benzoates respectively.

2. These salts dissolve individually without hindering each other, and not until the ions come together in the solution does any tendency towards precipitation occur.

3. The solution prepared in this way is about three times supersaturated in respect to calcium phosphate, and gives no detectable etching of the teeth.

4. Solutions prepared in this manner are stable for a few days, but gradually deposit the excess phosphates as a precipitate, and should therefore be prepared only as needed.

pH of Solution—The acidity of the solution requires close control. (A) Too much acid is itself objectionable as it encourages tooth etching. (B) If too alkaline enough Ca and Mg salts cannot be retained in the solution to combat the arsenate replacement reaction and the peroxide becomes unstable. For best results the pH should be from 5.0 to 5.2. The salts are chosen to give this value.

Value of Foaming Agent—1. The "loritol" (cetyl polyglycol ether) is a foaming agent used (1) to assist penetration of the solution into crevices, and (2) to form a stiff foam with the peroxide in these crevices. The foaming agent has a mechanical effect in helping to lift debris and assist cleansing.

2. Most foaming agents are useless

in this solution because it contains so much Ca and Mg. This foamer is chosen because it gives an excellent foam and also resists the action of peroxide.

3. Clinical tests with and without this foaming agent indicate clearly that it is a useful addition.

Use of the Mouthwash

1. This treatment is used as dispensed, without further dilution, about ½ ounce being vigorously rinsed in the mouth for two minutes.

2. It is then expectorated and the patient is advised not to eat or drink for half an hour.

3. This is repeated four times a day, after meals, and on retiring.

4. The patient is cautioned not to swallow any of the solution.

Clinical Results

Case A—Positive Vincent's smear, acute inflammation of gingival tissue, papillae much swollen and rounded. After two days' treatment with the mouthwash only, much reduction showed in the inflammation, only small areas at the gingival margin being involved.

Case B—Positive Vincent's smear, continuous ulceration throughout the gingival margin and interproximal spaces. This case was at first treated only with the mouthwash. After three days ulceration was completely eliminated although considerable inflammation remained. Greatly improved condition of the tissue was evident. In this case other measures were now instituted.

Case C—Positive Vincent's smear, ulcer of the cheek. Treated only with the mouthwash. Great improvement was shown in one day and without other treatment the site of the ulcer was barely noticeable after six day's use of the mouthwash.

Additional Clinical Features

1. One feature of the treatment is that cases of necrotic gingivitis respond with remarkable uniformity.

2. Pain is often perceptibly reduced in eight hours and rarely persists after twenty-four hours. The patient is usually comfortable the day

following the initial treatment.

3. Other acute signs and symptoms rapidly subside and the tissues are ready for further corrective measures in three days.

4. If the mouthwash is used for a few days longer a further reduction of the inflammation is often observed.

5. There is also no manipulation of acutely infected tissues; the treatment causes no tissue destruction and is painless.

6. Of the thousands of cases treated in the services there was no report of any cases failing to respond.

7. Vincent's organisms, possibly in a less pathogenic form, often complicate or aggravate other less specific oral inflammations. In many such cases the use of the mouthwash results in considerable reduction in such conditions.

8. A number of cases of Vincent's infection of the tonsils have also been treated successfully with the mouthwash.

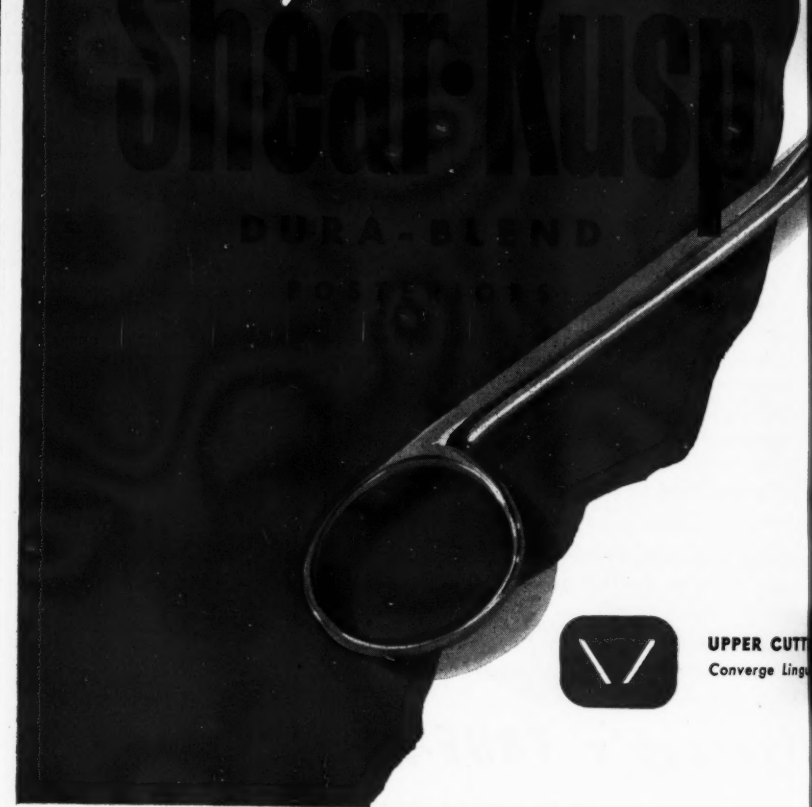
Conclusion

To date, although many thousands of patients have been treated with this

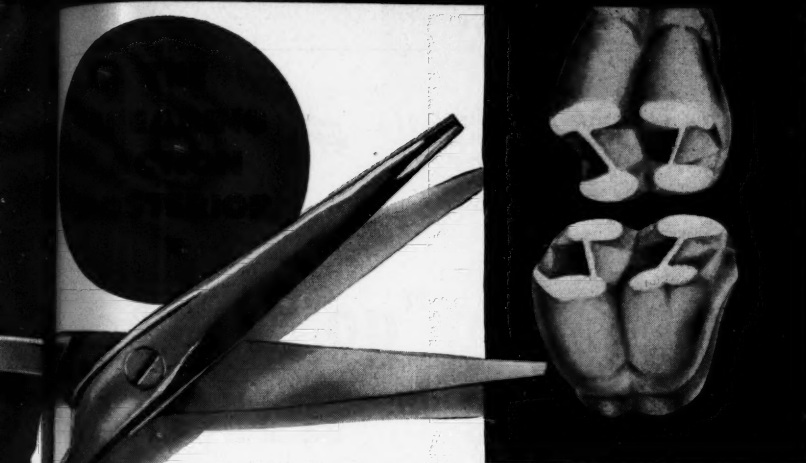
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IN OPPOSITION
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solution, none has exhibited any adverse or toxic reaction whatever which could be attributed to arsenic.

Adapted from *Journal of the Canadian Dental Association* 15:365-370 (July) 1949.

The Evolution of Oral Surgery

THE ORAL surgeon, if he is going to do justice to his craft, must be a highly trained specialist. The word "specialist" has come to be associated with

narrow-mindedness and a desire to concentrate intensely on a minute part of one's subject. Happily the evolution of our own specialty has entailed the broadening of our outlook, for the practice of oral surgery entails not only a comprehensive knowledge of dentistry and dental technique but also a thorough acquaintance with general surgical practice. At the same time dentists have been forced to appreciate that disease of the teeth and jaws is a disease of the body and that general disease of the body frequently produces disease of the

teeth and jaws. In doing so we have largely gone back to the time before this century when what we now call oral surgery was practised by men who were either practising general surgeons or men who had been trained in general surgery as well as in dental practice. In this century, in spite of the great increase in the technique and scientific resources of the oral surgeon, the custom grew up of oral surgery being performed by men who could devote only part of their time to it, and whose experience of general surgery was frequently limited to that absorbed during the acquisition of a medical degree.

The ideal oral surgeon would be one who has, first, a good practical knowledge of general surgery, secondly a complete acquaintance with dental technique and finally a special training in oral surgery. To acquire all this knowledge would obviously take far too long. So we must choose whether we prefer to train a man with a complete working knowledge of general surgery who is ignorant of dental technique or a man skilled in dental technique who has had only a general training in medicine and surgery. I myself am in no doubt which I should choose, for we have already seen how the oral surgeon must have a more than average knowledge of prosthetic technique: knowledge which takes years of application to acquire. At the same time I am sure that a man who has a general medical training, but who has had little general surgical experience, can acquire his technique during his training in oral surgery, provided that he is constantly in contact with the general surgeons.

From *Proceedings of the Royal Society of Medicine* 44:143 (Feb.) 1951.

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